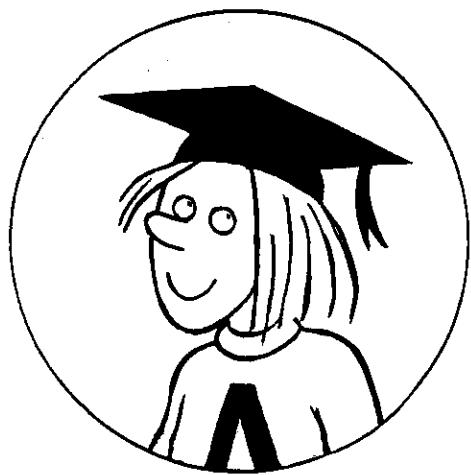
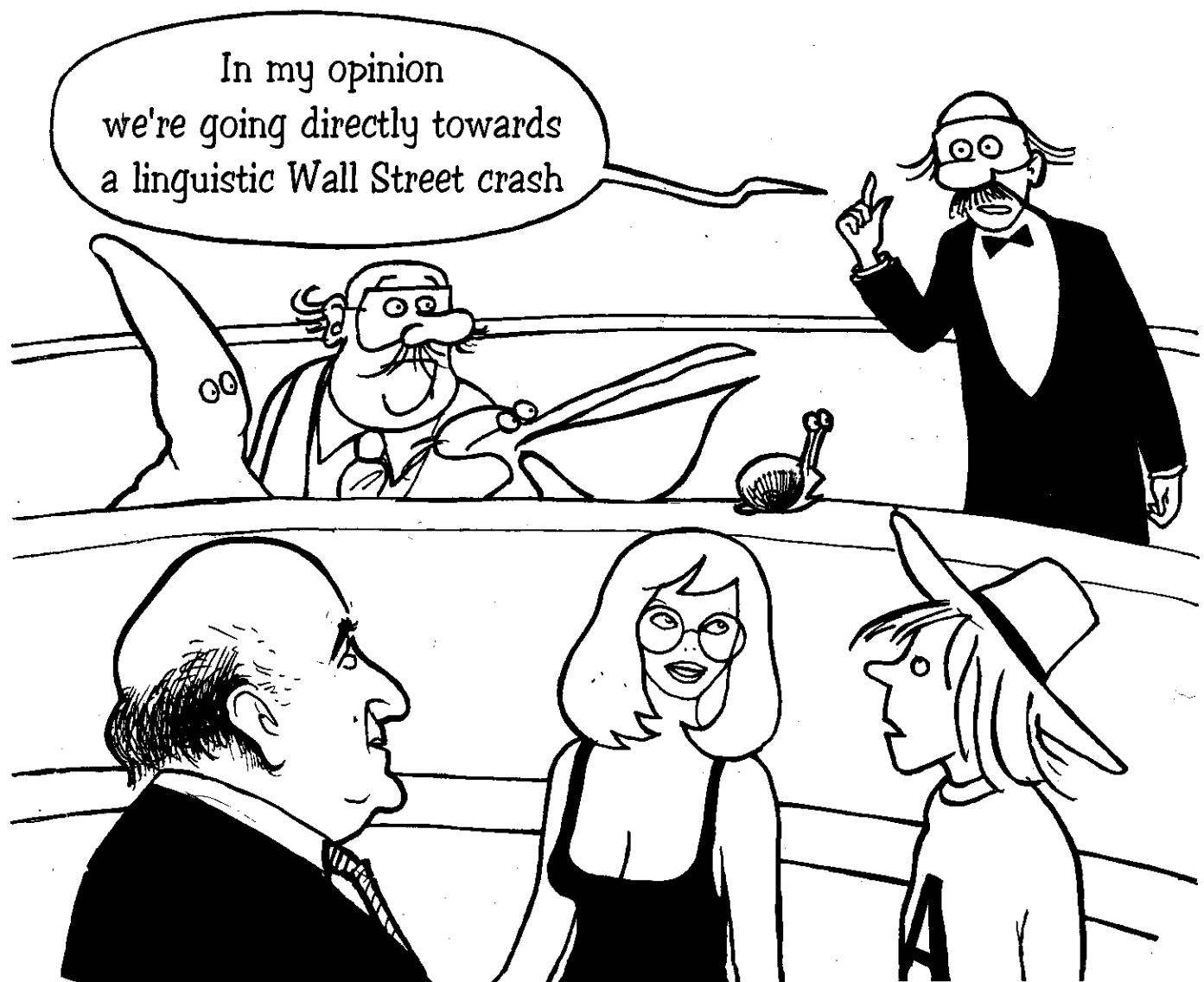


THE LOGOTRON

Jean-Pierre Petit



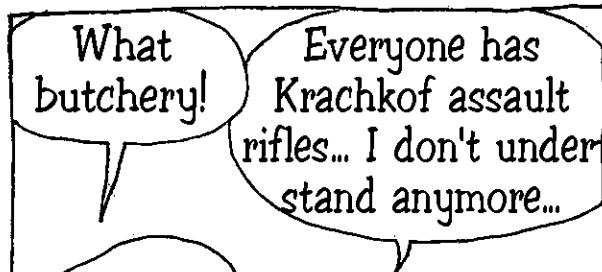
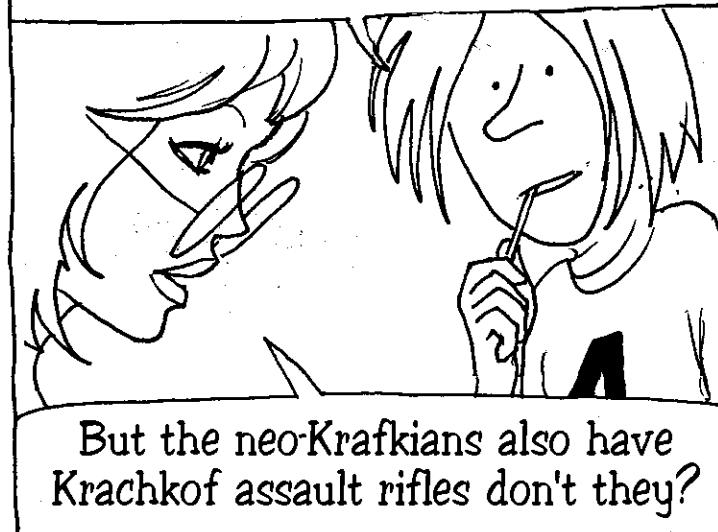
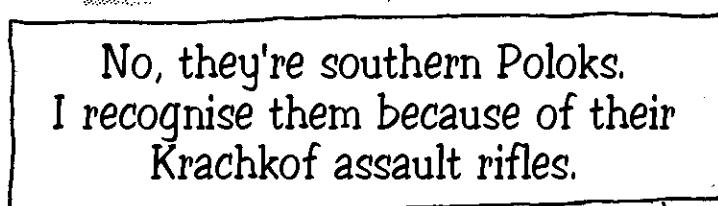
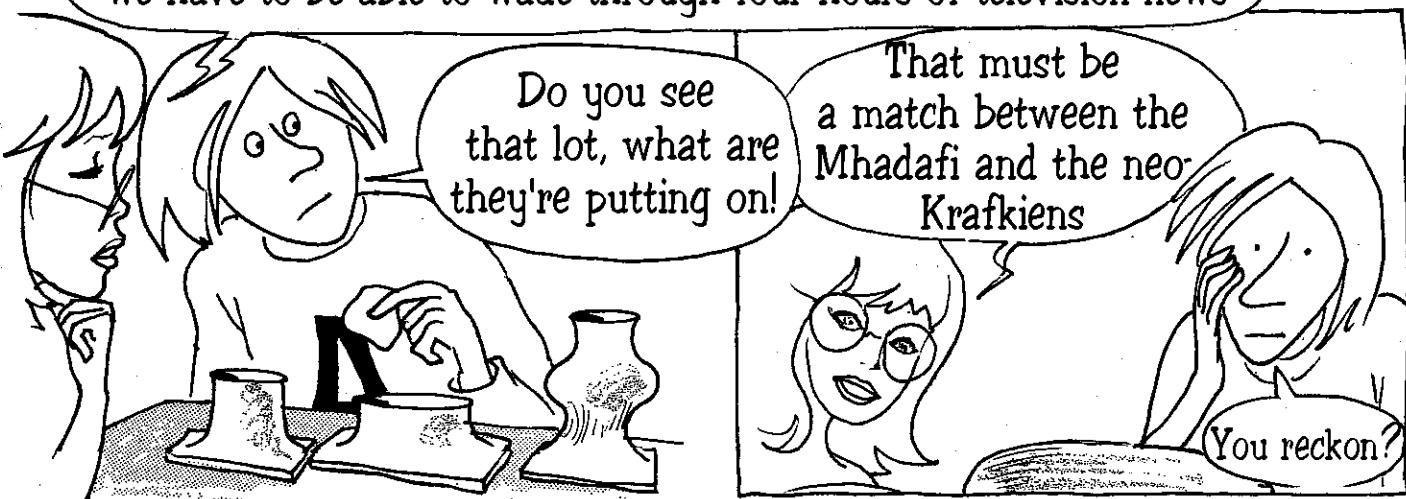
Translated by : John Murphy



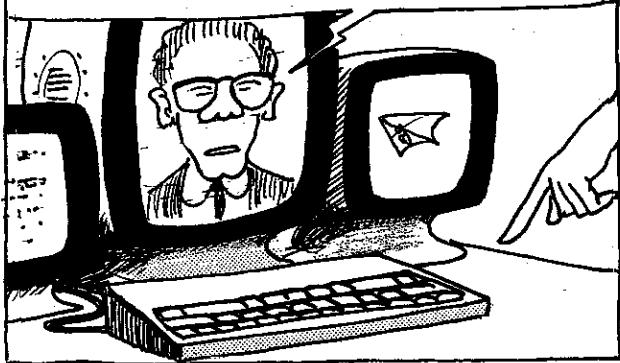
PROLOGUE



It's crazy. If we want to know something about what is happening, we have to be able to wade through four hours of television news



The president of the democratic, republican, progressive and independents group is speaking to you



Are you listening?
I can't hear anything!



No, I've turned
the sound off. It's more fun
like that. They look so stupid.

BLANCA, the **REAL**
washing powder

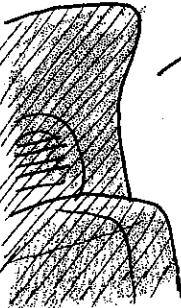
DANEKEN,
the beer that is
REALLY beer.

Turn that off!

The **VERITABLE**
potted meat.

Operation truth...

Newsflash: this morning there was an explosion at the national library. An unknown group entered the reading room and savagely hit the librarian, then set fire to the books before fleeing. The fire is now under control.



At the national library? That's odd...

BISCOTTA, the biscuit
that is **TRULY** a biscuit.

What channel is the match on?

This one, but you'll
have to turn the aerial
towards the transmitter.

Charity, please

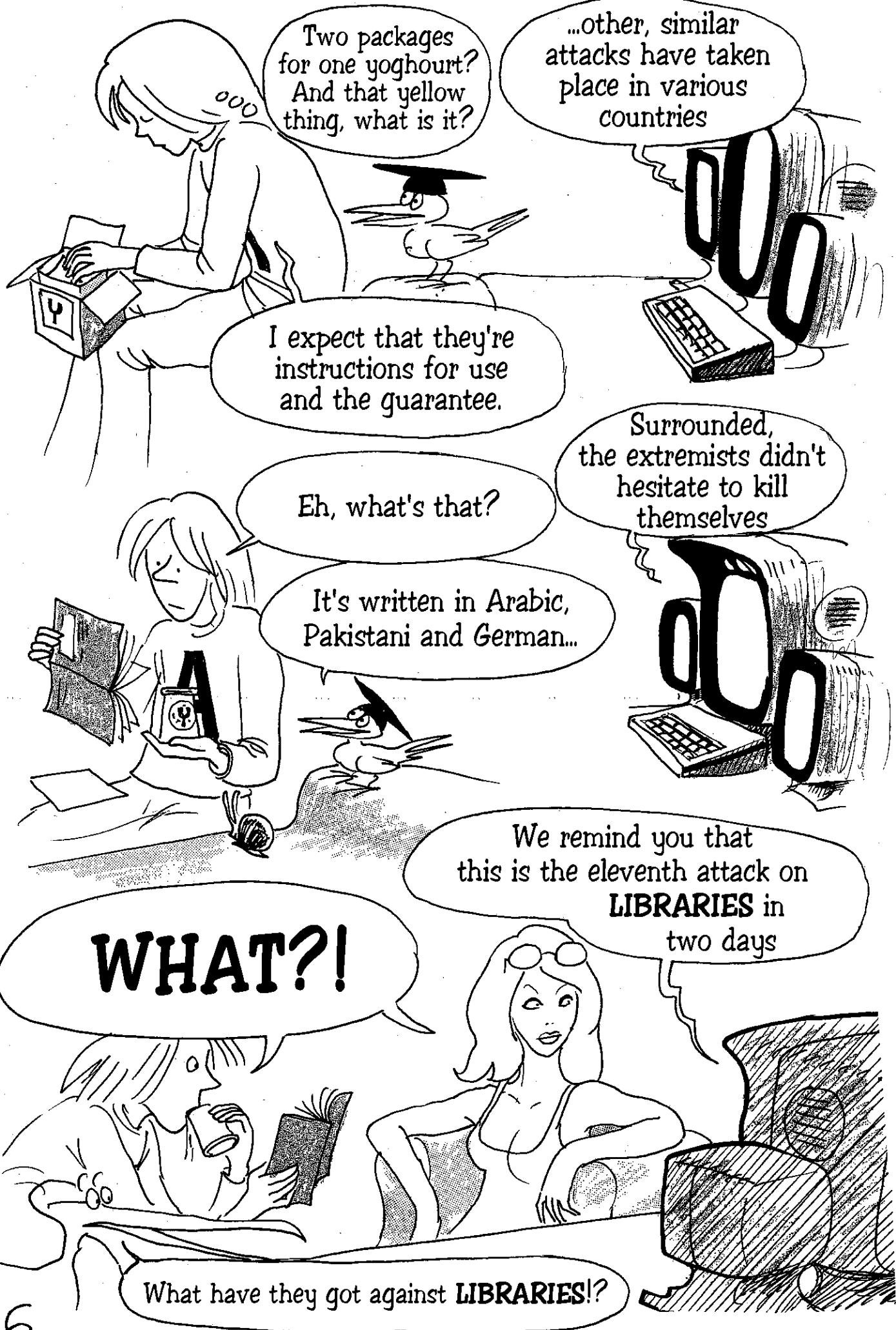
Don't bother. They can neither see
you nor hear you. They're wearing
their liquid crystal glasses and
their headphones, all in stereo...

What's that fellow doing with
a white cane? Is he blind?

No. Can you hear it? He's just watching a football match on his glasses.
That's why he needs a white stick so that he can find his way home

Good
goal!

Hey, six chimes
have struck already.
We'd better leave the
COMFORTABLES zone
quickly if we don't want
to be picked up
by a patrol.



And who are they?
St Michael's Mount
autonomists?

Among the inscriptions
painted on the walls, some
were **NONSENSE** and others
didn't say **ANYTHING**.

Among the terrorists who
blew themselves up at the Boston
library was the famous linguist
Professor Tomsky

But **THAT** doesn't mean anything
You **SAID** it

I think I'm starting to understand.
People have been talking lately
of an anarcho-linguist group.
I thought it was a joke but it seems
they've really begun their action.

Our correspondent on the
Sino-Mongolian frontier has
managed to enter into contact
with the anarcho-linguists.

News flash...

Wait, listen



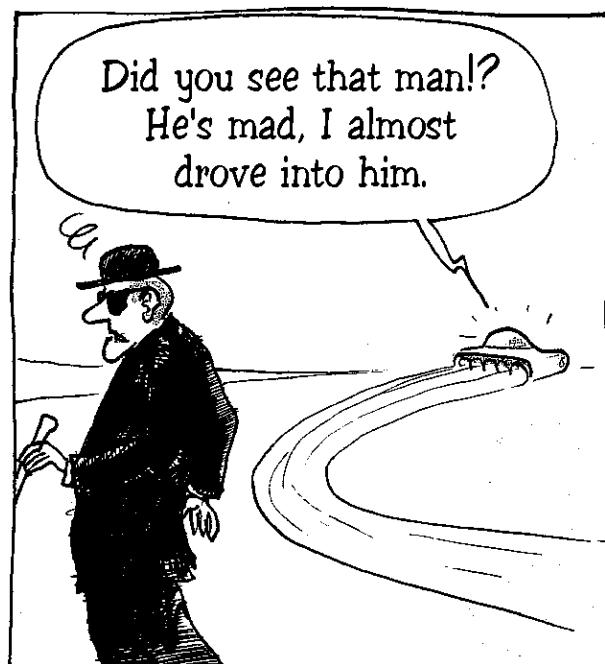
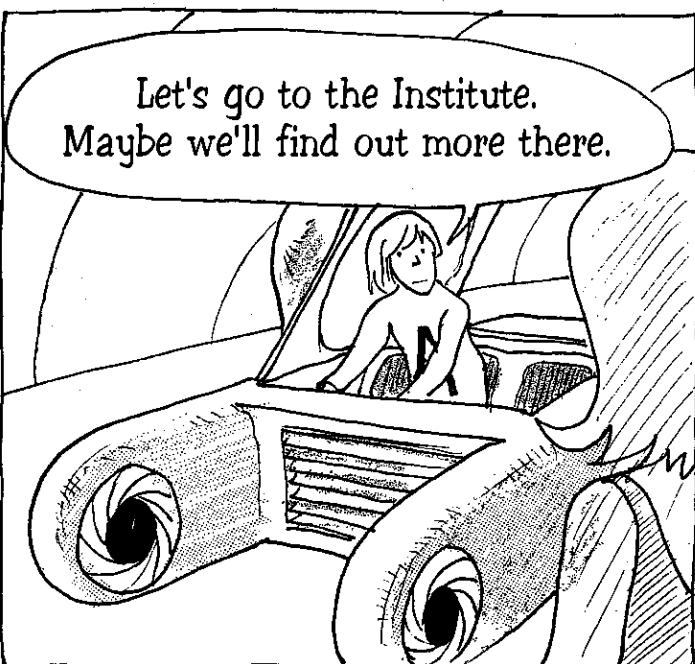
We are an international organisation
with cells in every country and with
linguists, logicians, semanticists and
glossomatiicians in our ranks.

That's odd, usually
when extremists meet
a reporter they
blindfold him

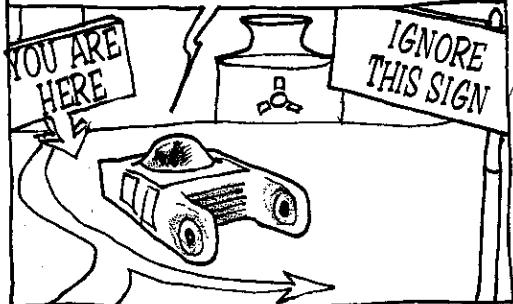
There they've put a sticking plaster on his mouth!

We have decided to strike those who speak to say nothing without pity, as we wish and where we wish.

That was Jean-Claude Gizmo of TF89



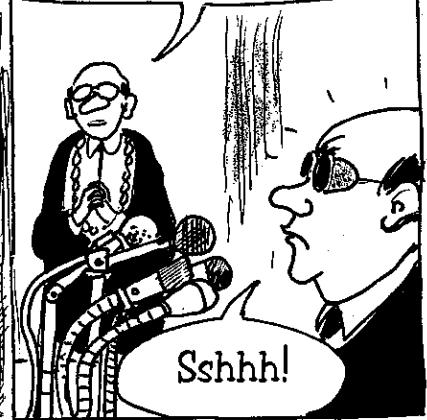
I think it's a new sect whose members have decided to wear dark glasses and EARPLUGS.



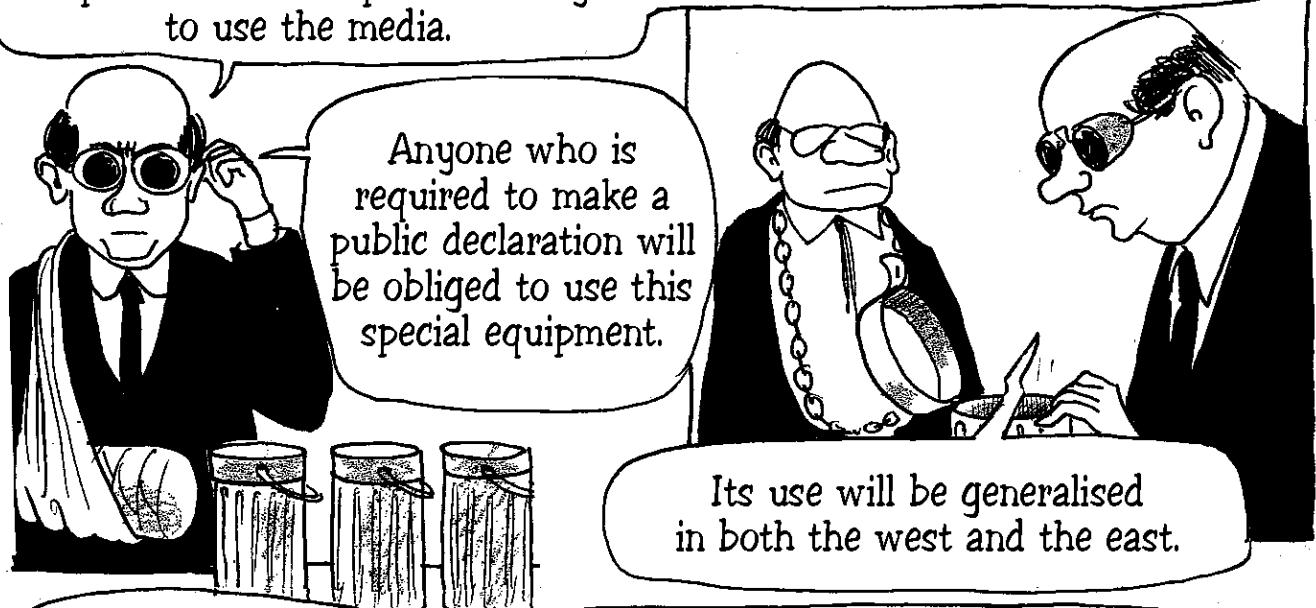
LITERATRONICS INSTITUTE



Gentleman... er... of the government



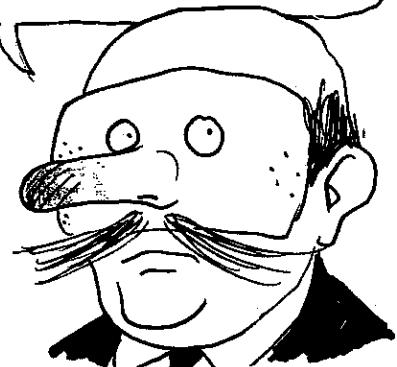
Ladies and gentlemen, on television yesterday you heard the threats proffered by this group of dissident linguists. We have good reason to take their threats very seriously and have taken immediate measures to ensure the protection of all persons likely to use the media.



But!?
That's a carnival mask!

Priority will be given to radio and television presenters and political personalities.

Hmm...
thank
you...



Here is a map showing where the latest attacks have taken place. As you can see, there have been many more than announced in the press. There has been no claim of responsibility for the majority of these attacks, which seriously limits the possibilities of stopping them. We believe they have been undertaken by the hardline wing of the **ANARCHO-LINGUISTS**, the **MUTISTS**, so named because they refuse all communication and act anonymously.

Most peculiar, when I've got nothing to say, I say so...

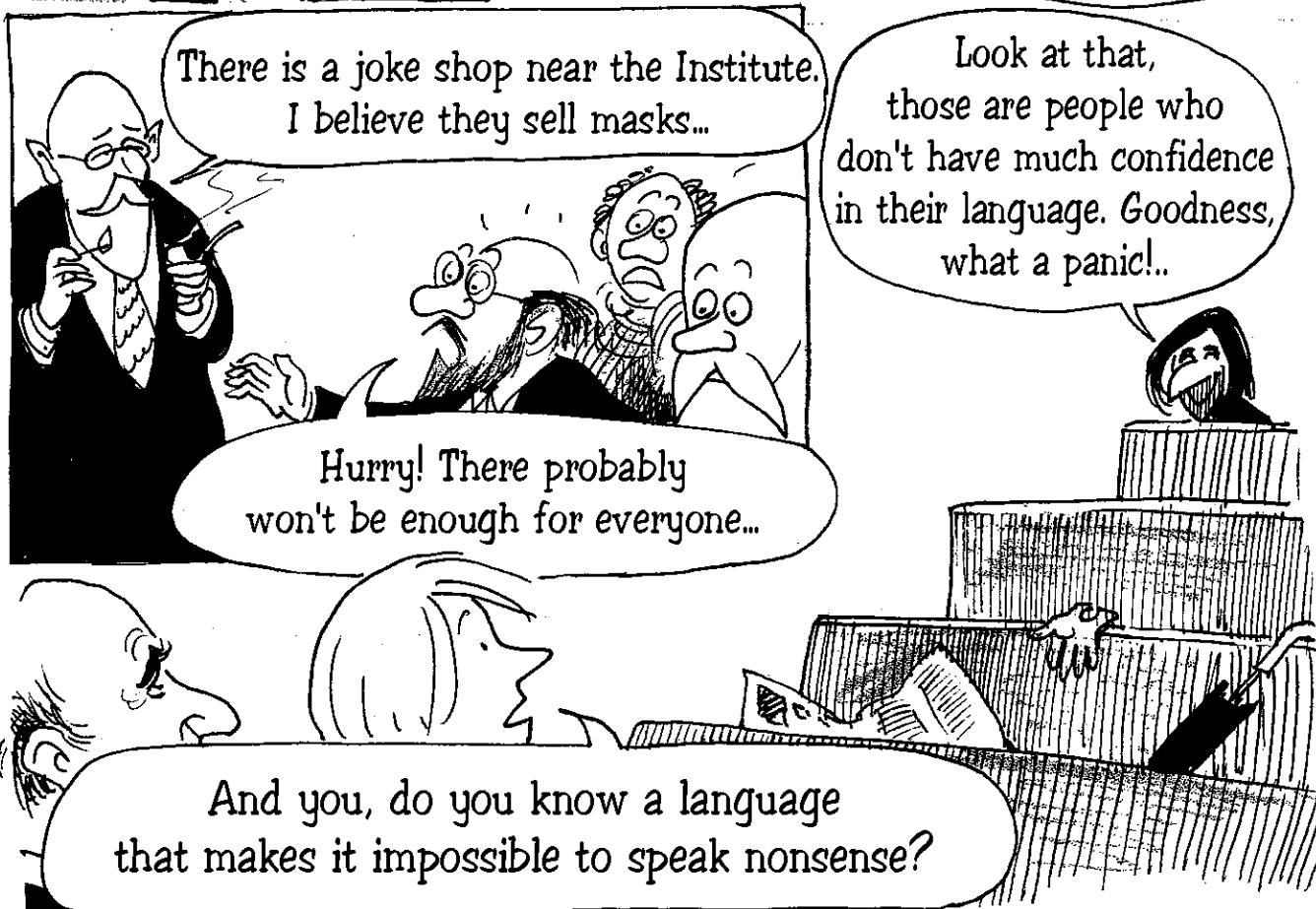
We are counting on your competence in linguistics and logic to see, above and beyond this crisis of civilisation, if we aren't confronted with a veritable **LANGUAGE CRISIS**

RUSSELL'S PARADOX

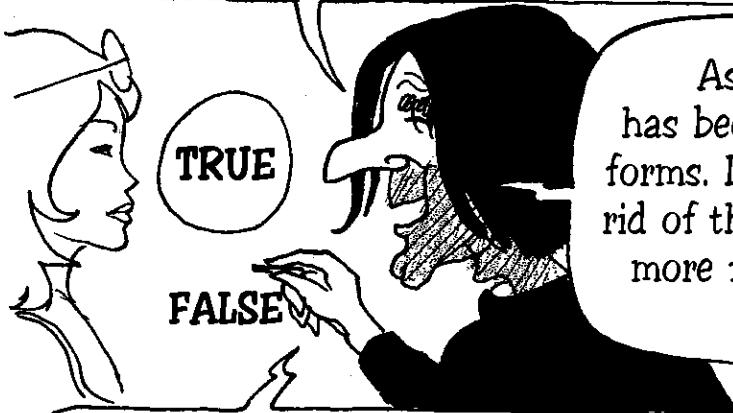
The government representative is leaving the Literatronic Institute.

OK. Has anyone anything to say?





SET THEORY is the touchstone of all languages. It's all a question of **CLASSIFICATION**. There is a set of things that are true and a set of things that are false. There is **WHAT IS** and **WHAT IS NOT**. There is the **EMPTY SET** where we put **NOTHINGNESS**

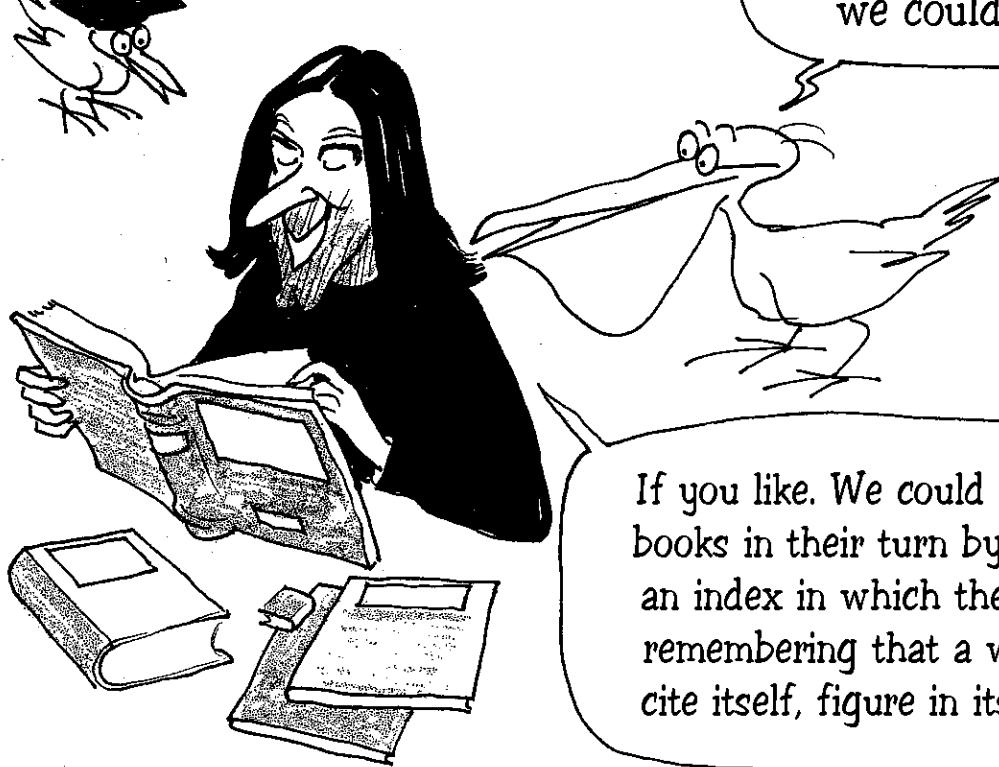


As time has passed, language has been enriched with many parasitic forms. I believe that we just need to get rid of this accumulated sediment to once more find, intact, the **FOUNDATION**, still present

The basic question is **THE ABILITY TO CLASSIFY EVERYTHING** into **SETS**, the criterion being "**BELONGS TO...**" or "**DOES NOT BELONG TO...**", all the rest is just **LITERATURE**

According to you then, laying the bases of a **LANGUAGE** consists of beginning with a very carefully classification of everything

To **CATALOGUE** everything in the Universe, existing or simply possible, we could use... books?



If you like. We could even classify books in their turn by giving them an index in which they'll be cited, remembering that a work can also cite itself, figure in its own index.



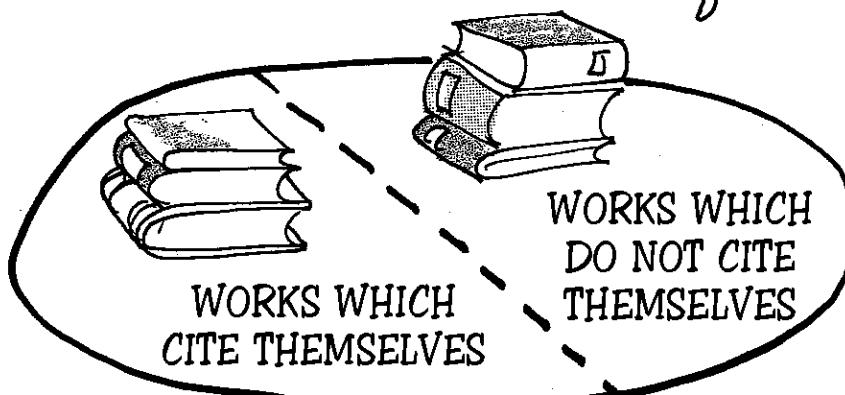
But it isn't obligatory
that a work cite itself.



Of course. But **SET THEORY**
has a response to **EVERYTHING**.
We create a new **PARTITION**: on
one side **WORKS WHICH CITE
THEMSELVES** and on the other
**WORKS WHICH DO NOT CITE
THEMSELVES**

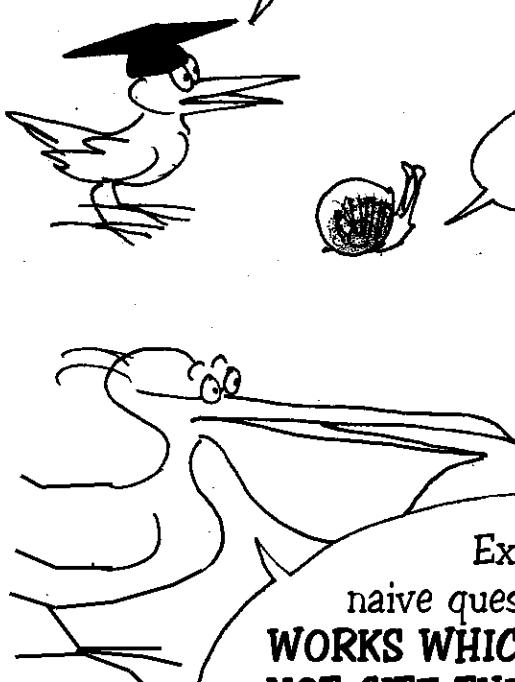


This allows
the classification of
ALL existing works.
Impressive.



WORKS WHICH
CITE THEMSELVES

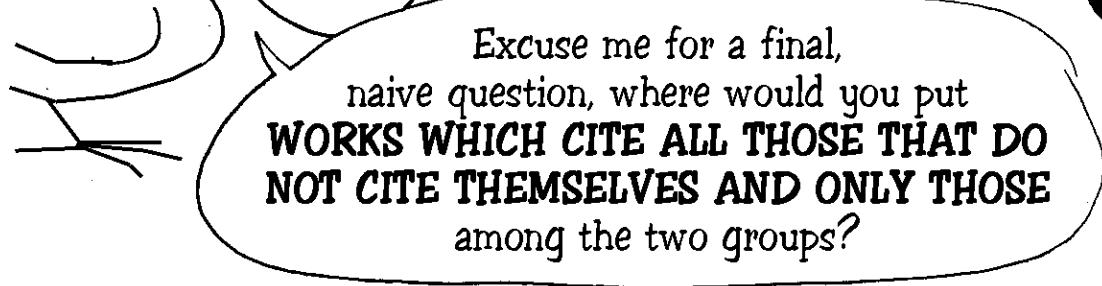
WORKS WHICH
DO NOT CITE
THEMSELVES



And I suppose that we can
catalogue these works?



We can catalogue
EVERYTHING



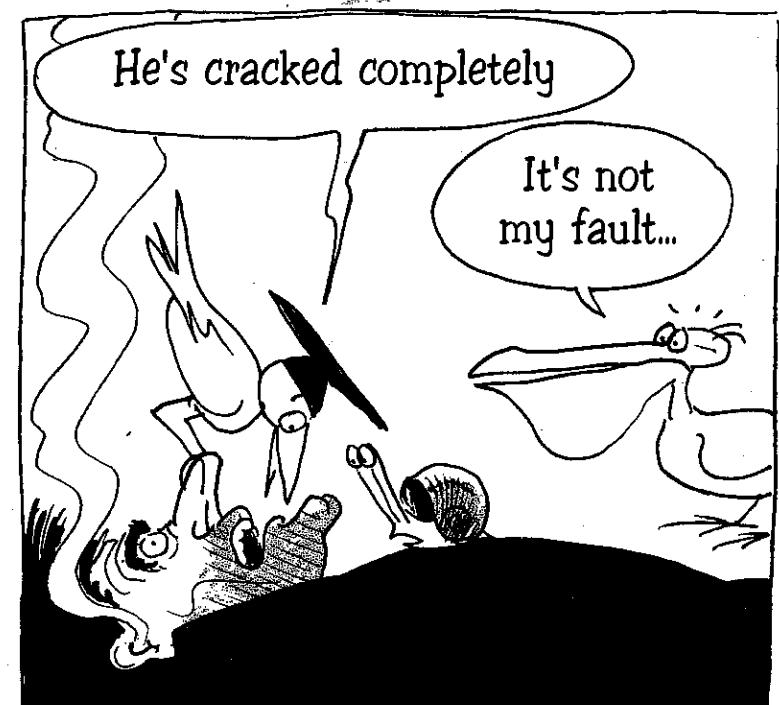
Excuse me for a final,
naive question, where would you put
**WORKS WHICH CITE ALL THOSE THAT DO
NOT CITE THEMSELVES AND ONLY THOSE**
among the two groups?

Let's see, should this work cite itself?
If it does cite itself then it no longer
EXCLUSIVELY describes works that do
not cite themselves, because it cites a
work that does cite itself, that is... **ITSELF**

So it shouldn't cite itself. However under
those conditions, as it is supposed to cite
EVERY work that does not cite itself,
one will be omitted... **THIS WORK**

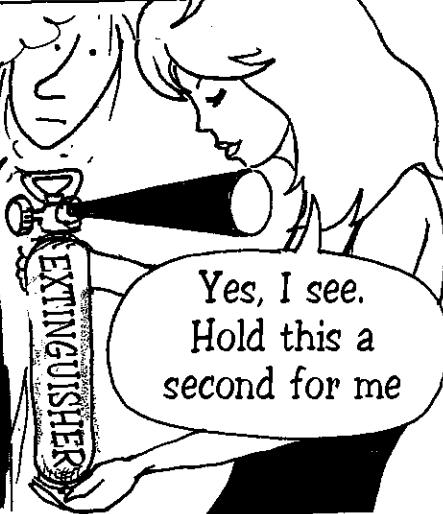


SHPLAT!



3 6 3

So EXIT SET THEORY as a FOUNDATION OF LANGUAGE



It's coming out of the other side!

It's normal! It proves that it works



I suggest that we go and see **MATHEMATICIANS**, I'd be amazed if they haven't got a recipe to get us out of this.

My question earlier seems to have caused a state of intense intellectual stress for this poor gentleman.
I admit that I'm not sure why...



It's simple:
he was talking about the principle whereby things can always be classified, attached to groups **DEFINED BY PROPERTIES**

Here's another way to formulate this **PARADOX**. Imagine a village where men are classed into two groups according to the following **CRITERION OF BELONGING**. One contains the men who shave themselves and the other those who do not shave themselves. Imagine a barber whose job it is to shave all those men who do not shave themselves, and **EXCLUSIVELY** those



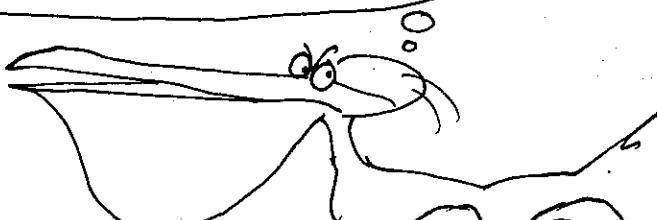
Question: which set does the barber belong to?



Let's see, if he shaves himself then he is shaving a person who shaves himself, which is contrary to his function.



But if he doesn't shave himself, then he has omitted to shave a person who does not shave himself. Dilemma...



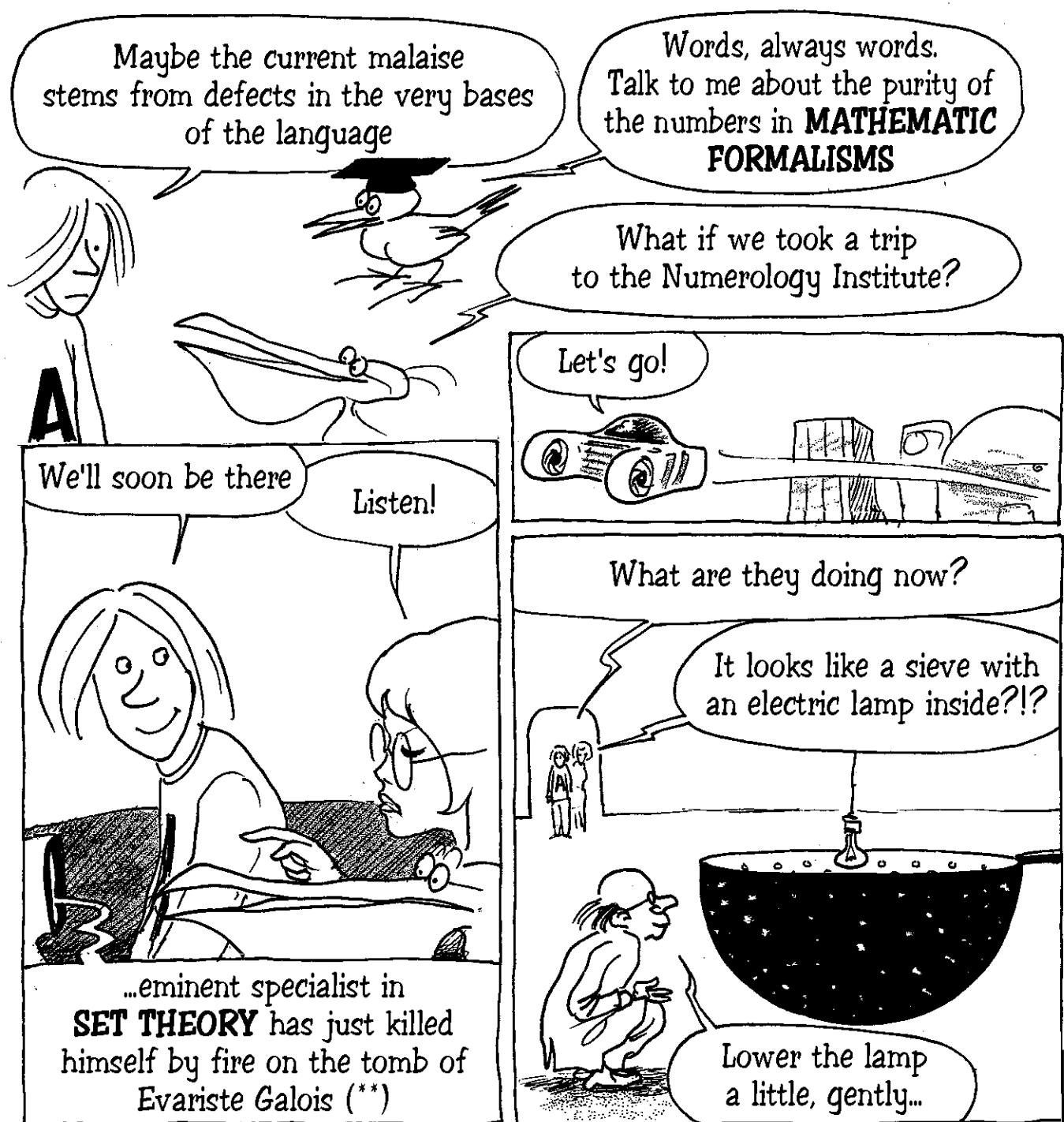
In truth, all languages are full of contradictions like this. The **PROPOSITION** "I lie" is neither true... nor false!



It's a proposition that is **UNDECIDABLE**



NON-CANTORIAN SETS (*)



(*) From the name of the German mathematician Georg Cantor (1845-1918), creator of set theory.

(**) French mathematician (1811-1832). Killed in a duel.

Go on, turn it on

Marvel of marvels!
It works!

But what are you
up to for heaven's
sake?

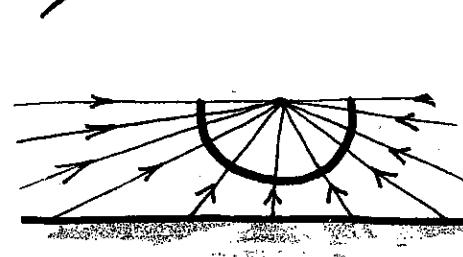
Can't you SEE? Thanks to this system
I can make each hole in the plane correspond
to a hole made in the sieve.

But a plane possesses an infinity of points?

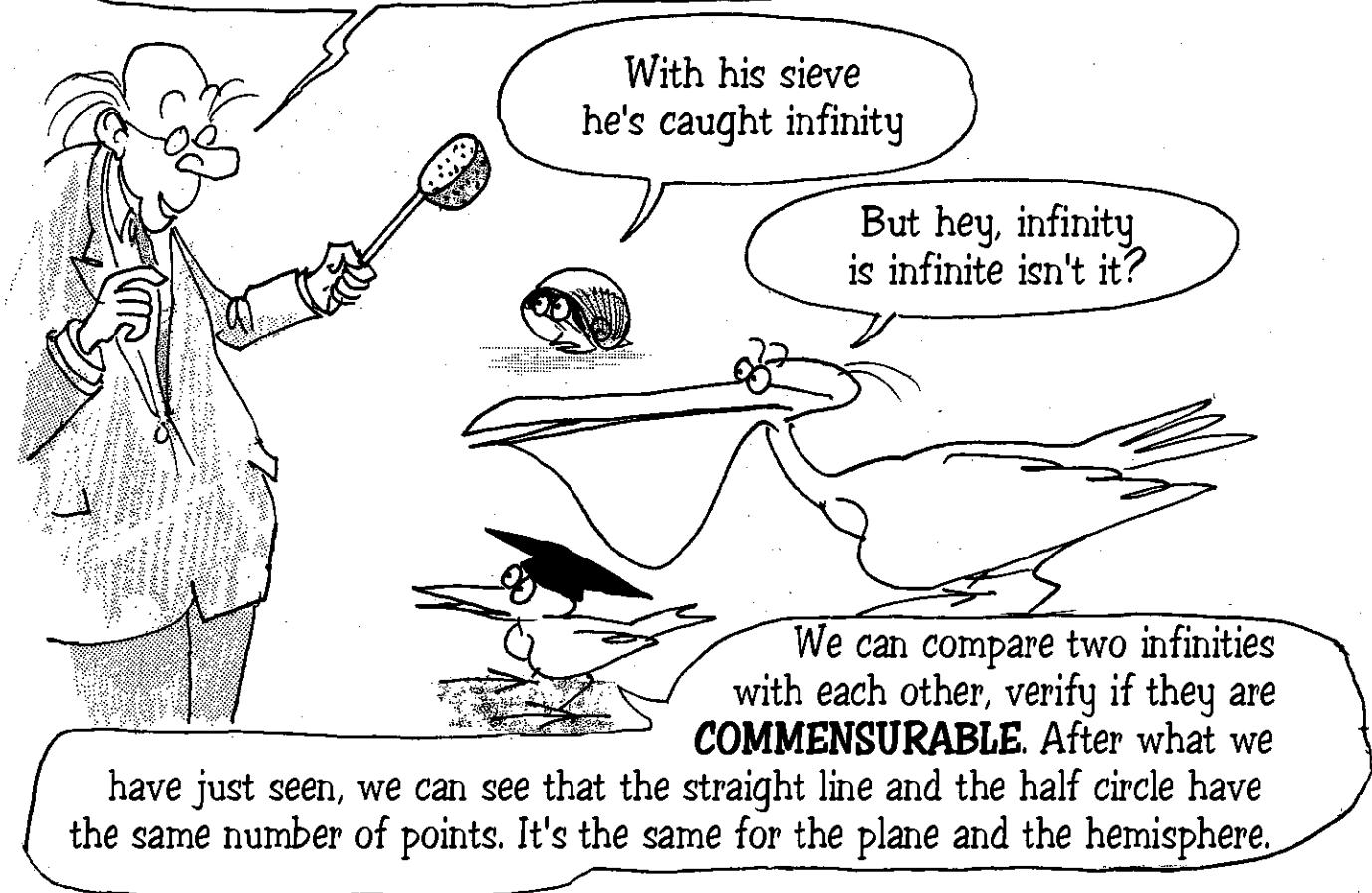
Well you just
need a sieve
with an infinity
of holes



In the same way we can link two by two the infinity of points
in a straight line to the infinity of points present in the arc of a circle



Do you understand the transcendence of this discovery?
There is an infinity of points on a straight line and, equally, an infinity of points on a semi-circle. But the preceding experiment shows that there are **AS MANY**. The same as there are as many on an infinite plane as on a hemisphere, or a disc

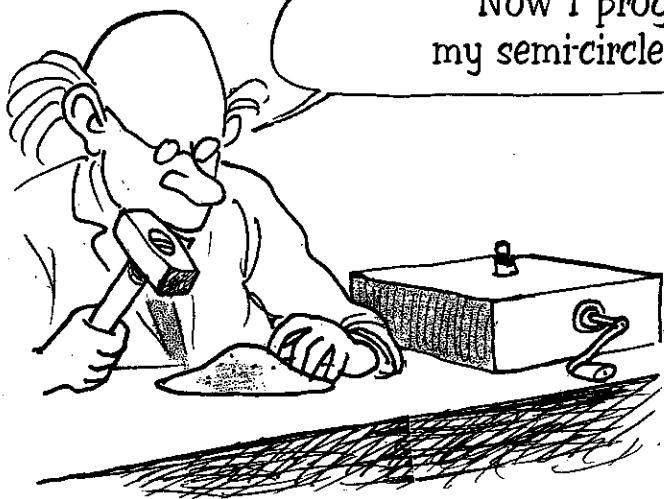


Now let's deform the semi-circle according to a segment of a straight line

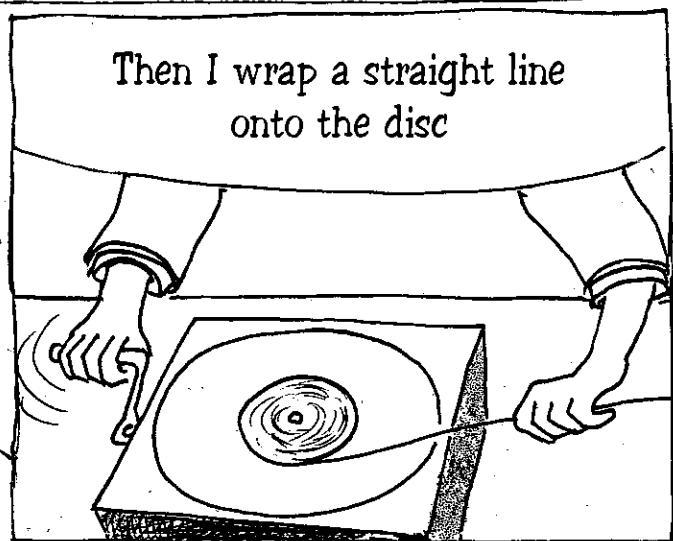
Wait... The segment is itself a part of the straight line. So when we reason on the infinite, **THE PART CONTAINS AS MUCH AS THE WHOLE !?**



Now I progressively deform my sieve,
my semicircle, according to a **DISC-PLANE**



Then I wrap a straight line
onto the disc



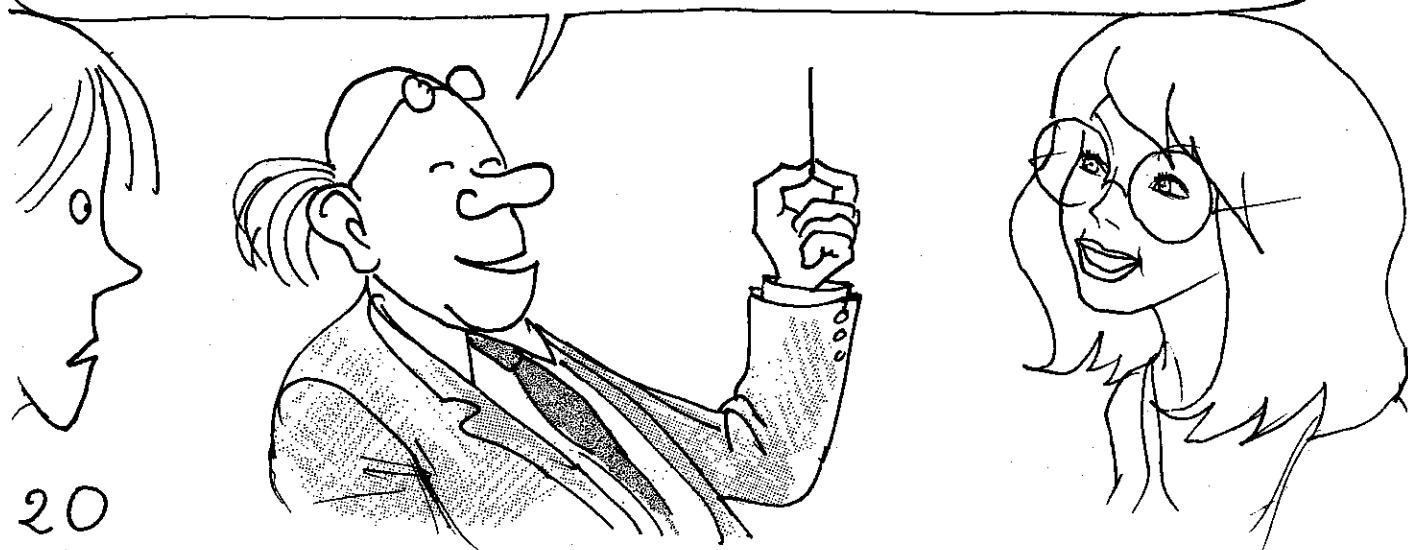
Of course this operation will take
an infinite time, but it illustrates the
fact that there are as many points on a
straight line as on a disc, or a plane

There's a thing



Or in a given volume.
This tends to show
that all infinities
resemble each other.

Any object of dimension N , not nil and not infinite, possesses the same number of points. Thus a spacetime (x, y, z, t) of four dimensions, be it finite or infinite, possesses as many points as a segment of unit length.



What are you playing at exactly?

Young man, if you had followed closely all the transcendence of my reasoning you would have understood that there exists as many points in a quadri-dimensional spacetime (x, y, z, t) as in a segment of unit length

So all possible states that the universe could reach, be they finite or infinite, in space and in time, all its structures, all its richness, are 'a priori' contained in this seemingly derisory object in which we have... trapped infinity...

Who would have thought it?

We wear ourselves out with vain words speaking about **EVERYTHING** and **NOTHING**, when all is contained in this hair which it suffices to split indefinitely

The final operation consists of locating these points of the segment with the help of a **NATURAL SEQUENCE OF WHOLE NUMBERS 1, 2, 3...** which thus constitute a universal language

Have we got hold of the right thing this time?

One and one and one...



Erm... I...



We are going to **COUNT** them by indexing,
by numbering them with the help of
THE SERIES OF WHOLE NUMBERS
through which we have a hold on every
thing in the the Universe

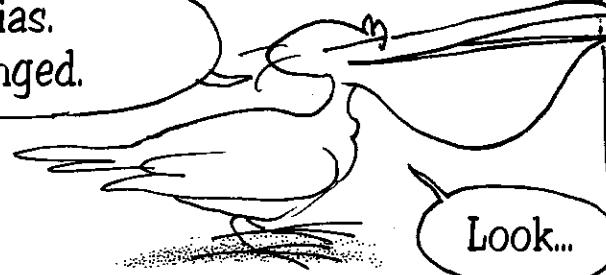
I thought that numbers
were a pure language

Stop, there's
something wrong



I reckon that it's impossible to arrange
this infinity of numbers between 0 and 1
in any sort of order.

Don't be silly Tiresias.
They're already arranged.



Explain yourself
Tiresias

Suppose that I construct
a number from the figures
situated on the diagonal
of this doubly infinite table

0, 5 1 1 0 2 4 5 9 7 8

1	0, 5	0	4	8	2	3	1	7	8
2	0, 1	1	7	4	3	3	1	9	2
3	0, 1	2	1	9	2	8	3	2	0
4	0, 0	0	2	0	1	1	4	7	4
5	0, 0	0	0	2	2	1	4	5	9
6	0, 9	5	3	2	0	4	1	5	7
7	0, 3	7	3	7	2	1	5	6	4
8	0, 9	8	7	5	1	6	0	9	2
9	0, 1	3	2	8	5	4	4	9	7
10	0, 2	0	7	2	7	5	2	9	0
11	0, 7	9	8	4	0	0	2	1	
	0, 0	0	2	3	1	1	2	0	
	0, 7	4	3	5	5	2	1		
	0, 8	9	0	5	5	2	1		
	0, 7	0	0	0	4	2	3		

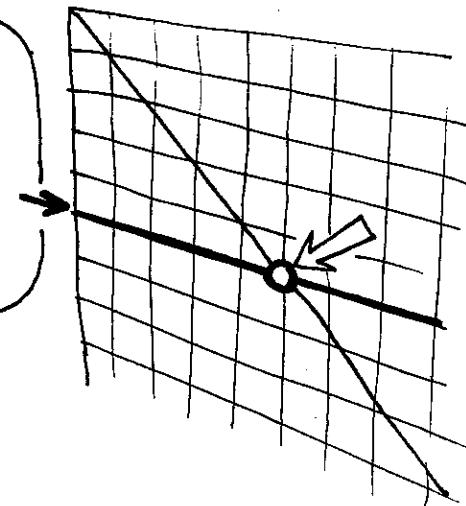


From this number I can create another where all the figures will be different.

INFINITE

0	5	1	1	0	2	4	5	9	7	8	0	0	7	5	1	8	1	4	4	5	C
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
0	7	6	9	8	4	2	1	3	2	9	3	3	1	1	5	6	7	6	6	3	1

This number **IS NOT** in the table.
In effect, if it were there would be
an identity between one of the figures
of the series and a figure of this famous
diagonal, but that is impossible to get
by simple construction



OK, you've found a number that isn't in the table, nice job.
But we just need to put it into a new set, no?

Sadly not Leon. Tiresias' generation method
allows the creation of an **INFINITY** of numbers
which aren't in the table

In short, this table is a sieve...

But... all the other numbers,
WHEREVER could they be?

That's your problem
my friend...

If I understand it correctly, mathematicians also have
problems with their **MATHEMATICAL LANGUAGE**

But... I...

Your thing
isn't very clear.

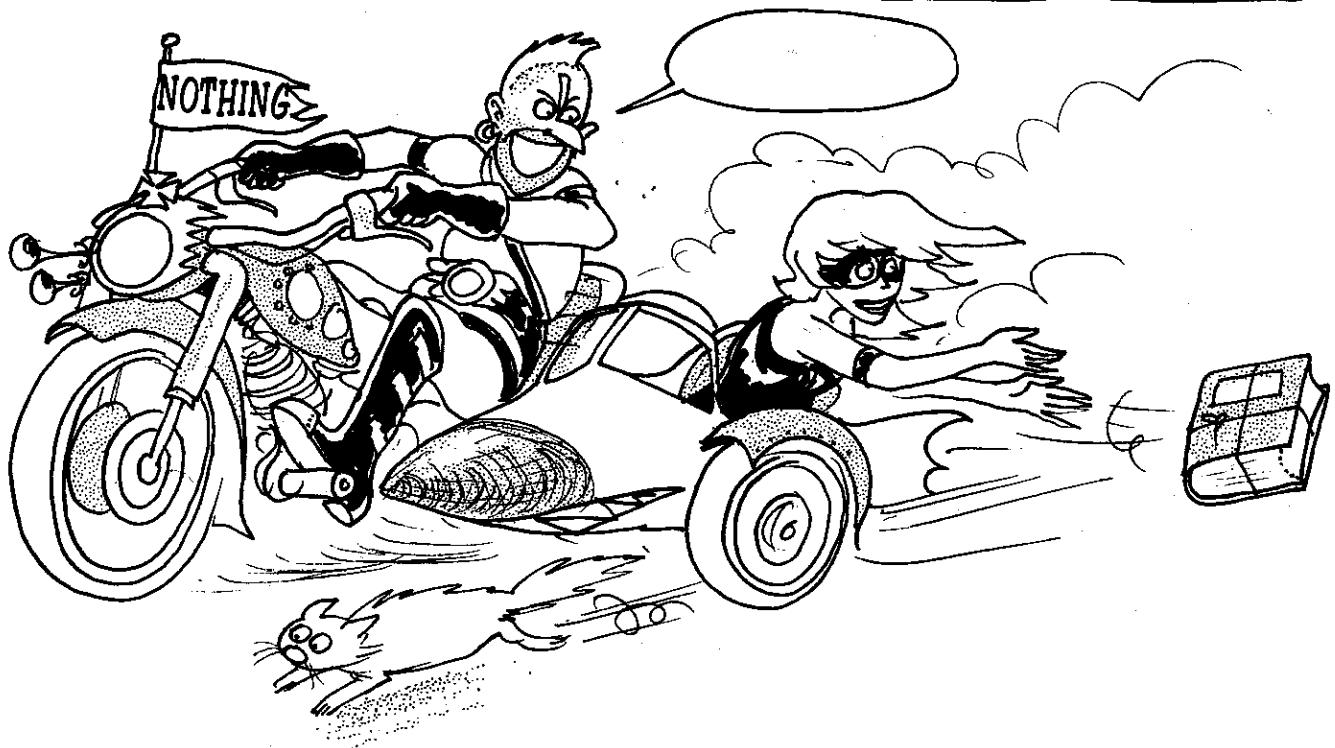
OK,
let's go home...

INSTITUTE OF
NUMEROLOGY

BANG!

!!!

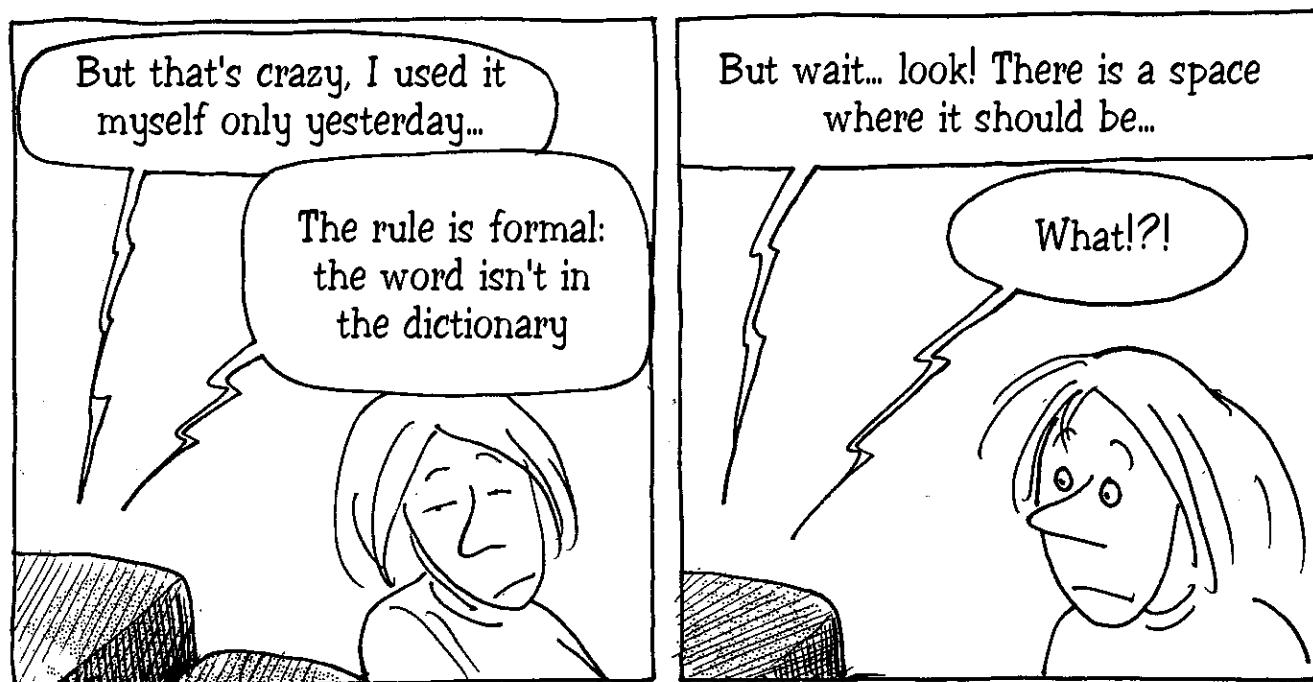
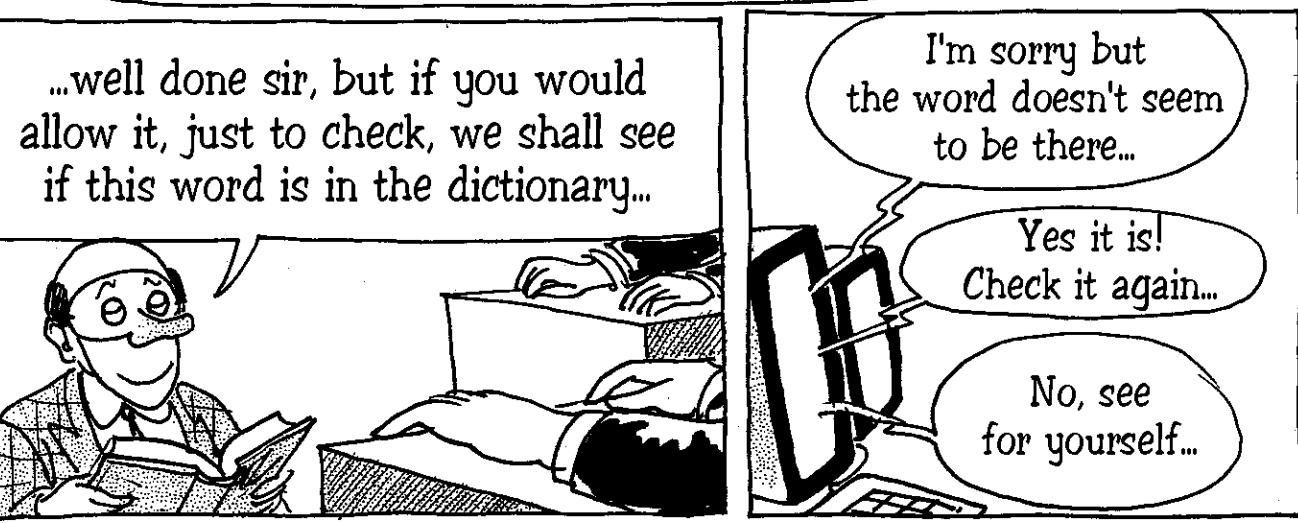
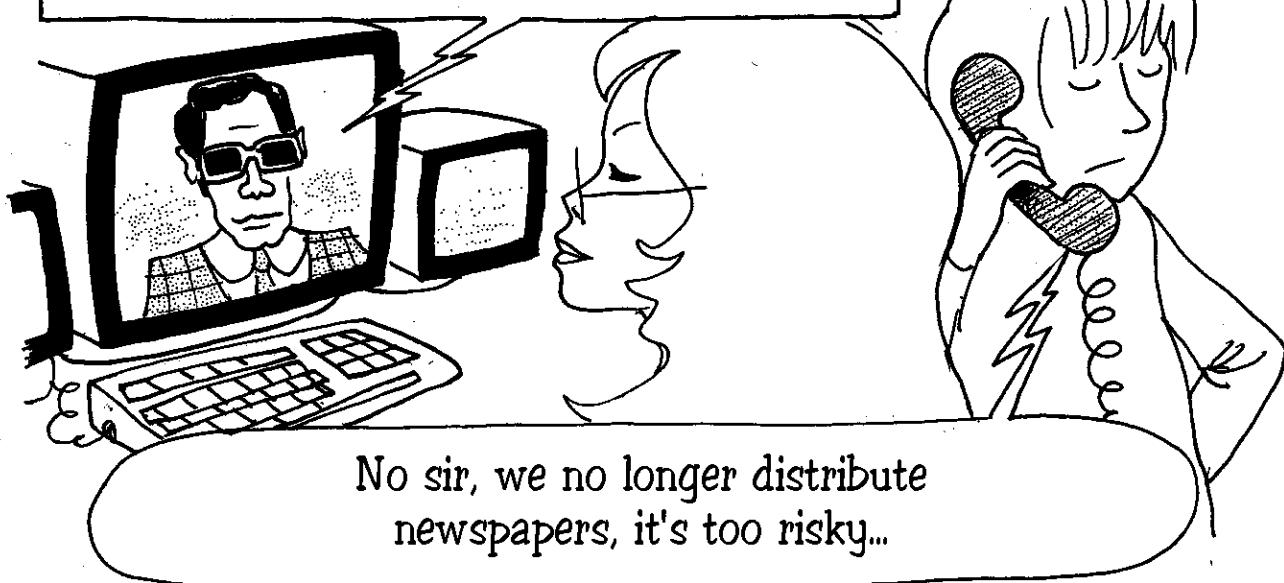
During that time the anarcho-linguistic brigades continued to lay waste to the world's libraries where their booby trapped encyclopaedias caused terrible damage.



Systematic anonymity and the total absence of communication between the anarcho-linguistic groups makes their identification almost impossible, despite the traps imagined by communication advisors.



After this (very short) newsflash we move on to our game of numbers and letters, Countdown



But... there are are spaces everywhere! This dictionary is a fake sir, it's shameful

This seems very much like Escarpit's syndrome

What do you mean?

Up until now this problem only affected ancient languages, ones that are no longer spoken

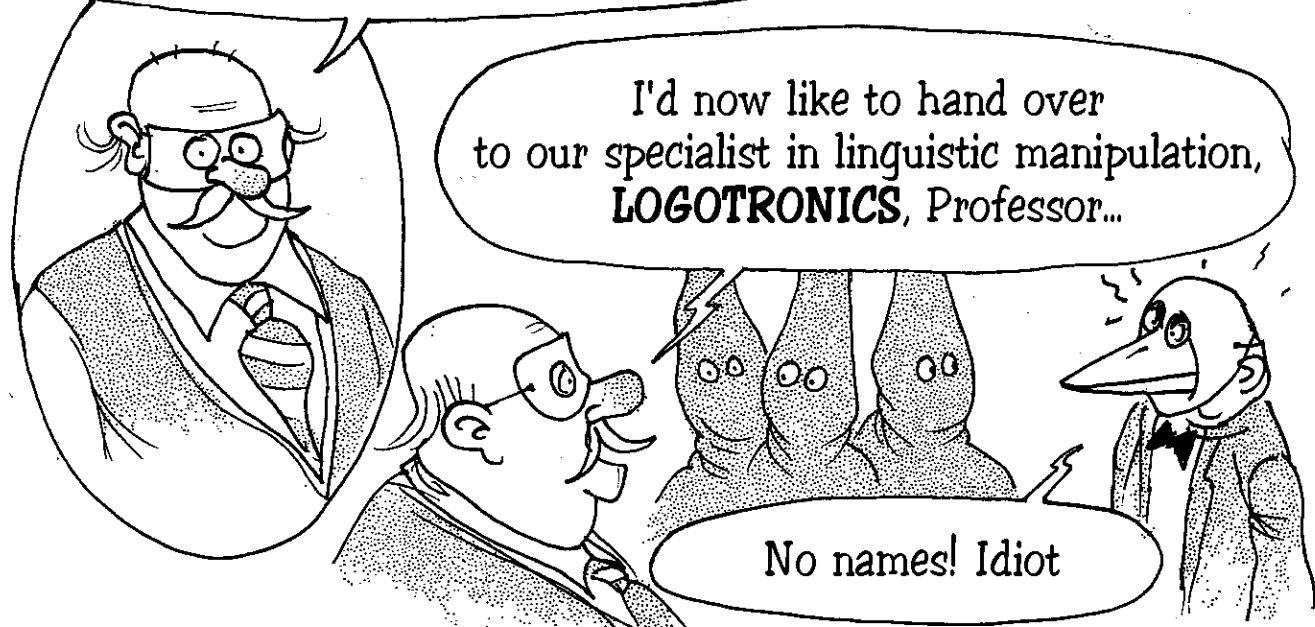
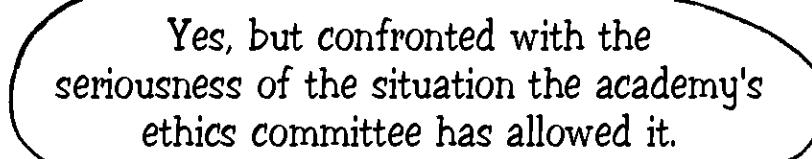
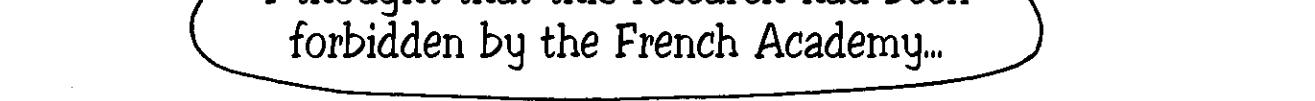
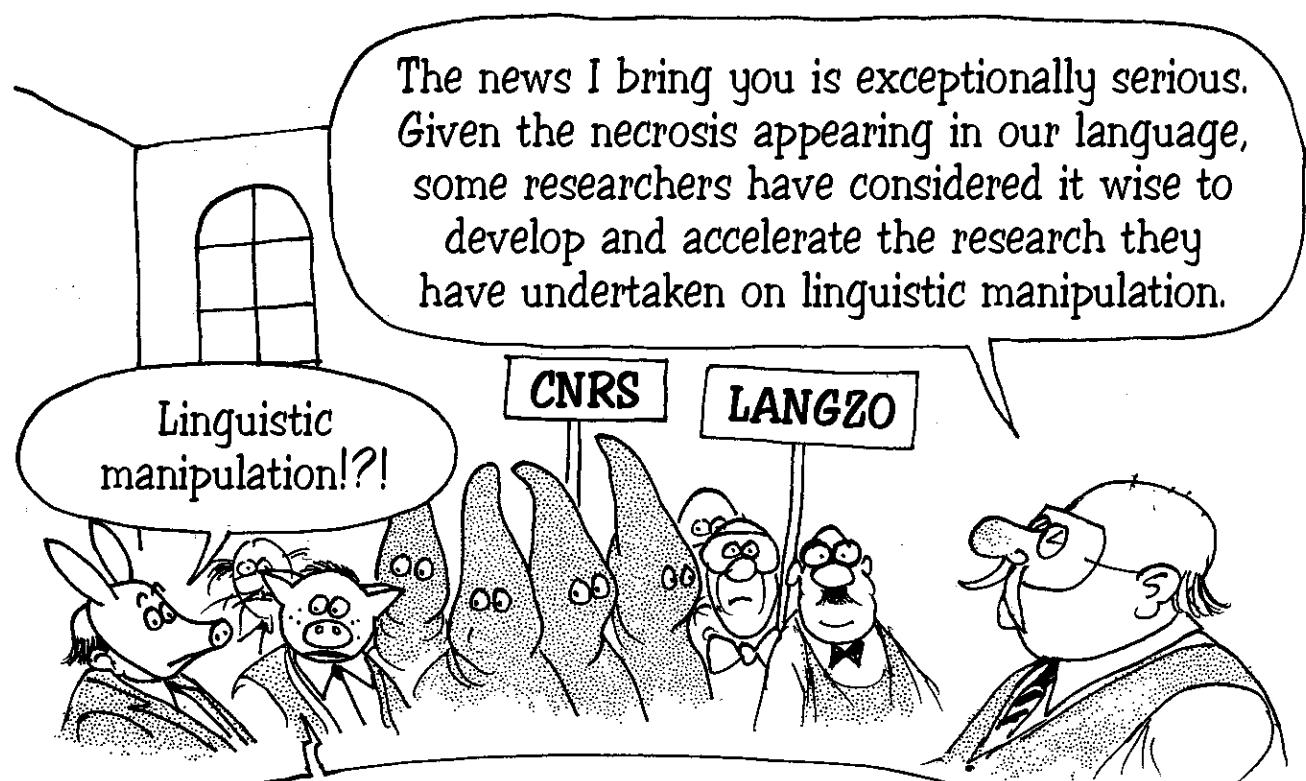
During the following weeks, the language began to literally empty more and more. People began to panic, trying to find their words

But, in the end, aren't words like elementary particles with a limited life span?

At the Literatronics Institute they refer to this a **LOGOSIS**

The situation in the world deteriorated. The anarcho-linguistic movement caught on and spread and, having started in the university world, it was then echoed by high school teachers, and even those in primary schools

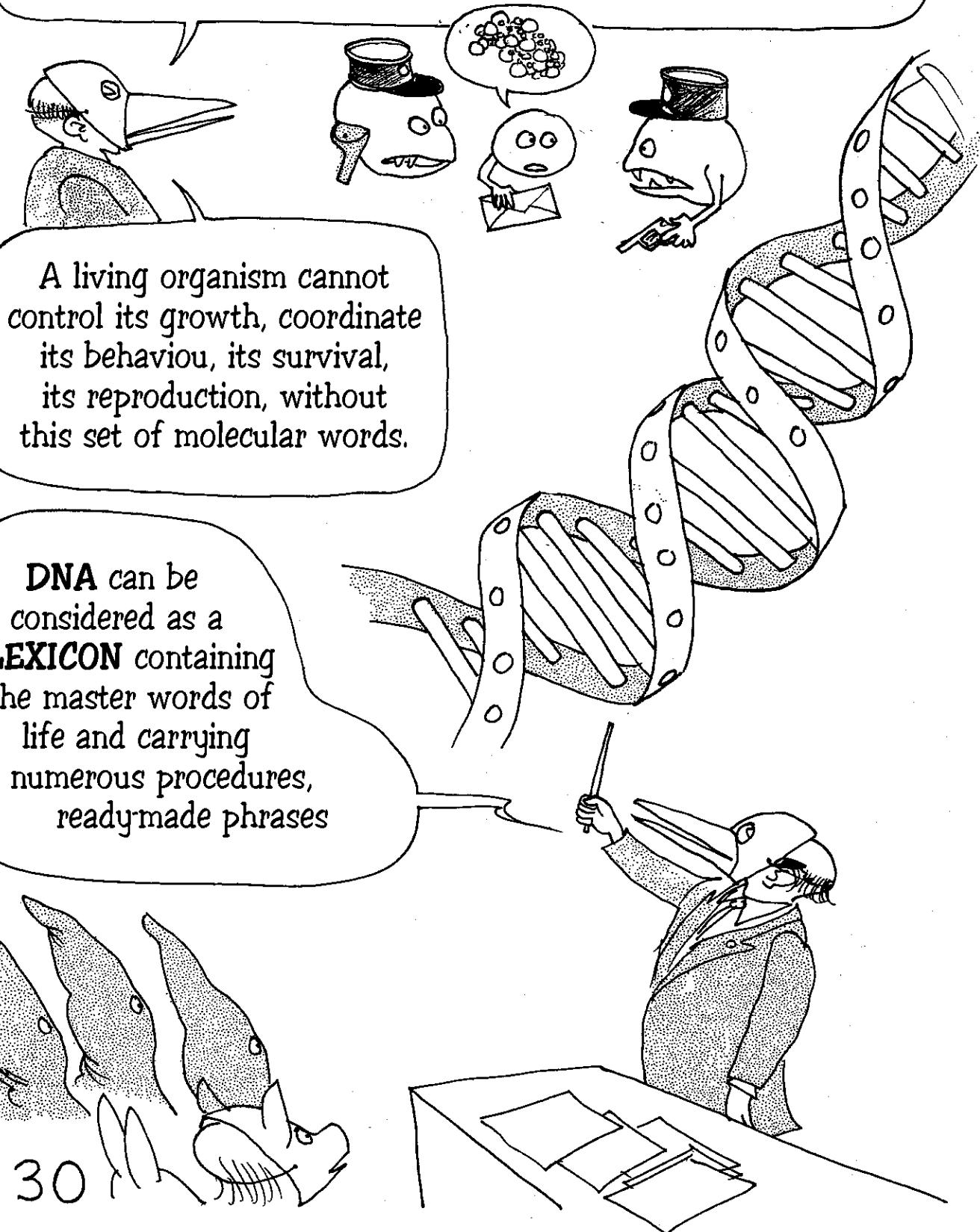
NEOLOGISMS



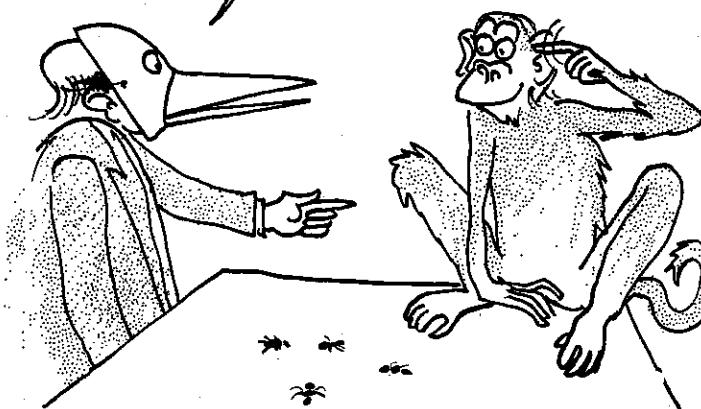
The first language that we know is that of cells, which communicate with each other using molecular chemical signals.

These messages give rise to extremely varied behaviour.

For example, certain cells must emit, or carry, a password molecule in order to be allowed to circulate in the organism.

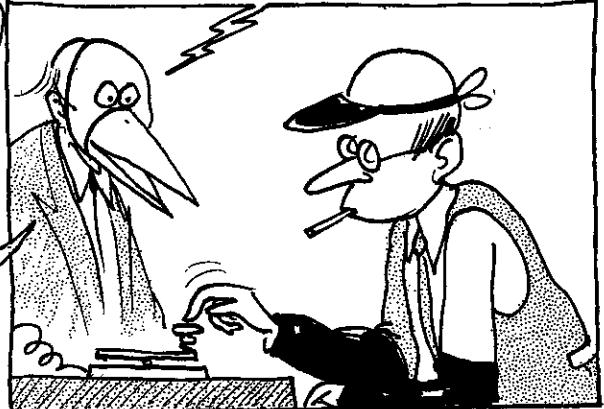


It has happened that we have developed a set of sound signals and graphic signs that allow us to communicate but, as social beings, we could just as well have developed the gestual communication of apes or the chemical communication of ants.

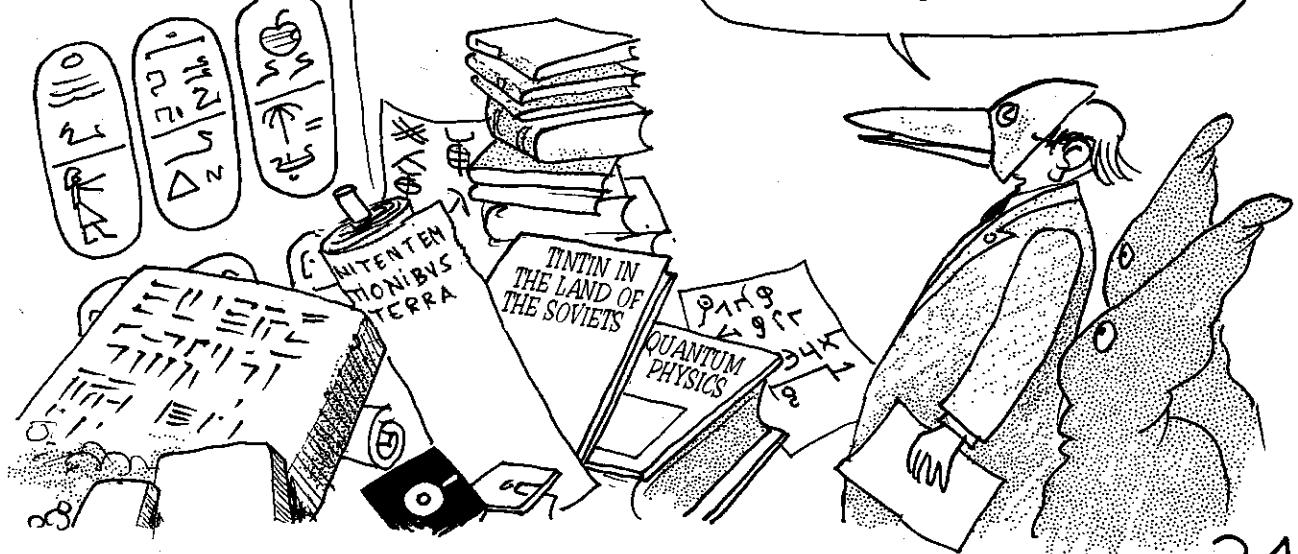


So this language, thanks to electromagnetic transcoding, lends itself to communication over great distances.

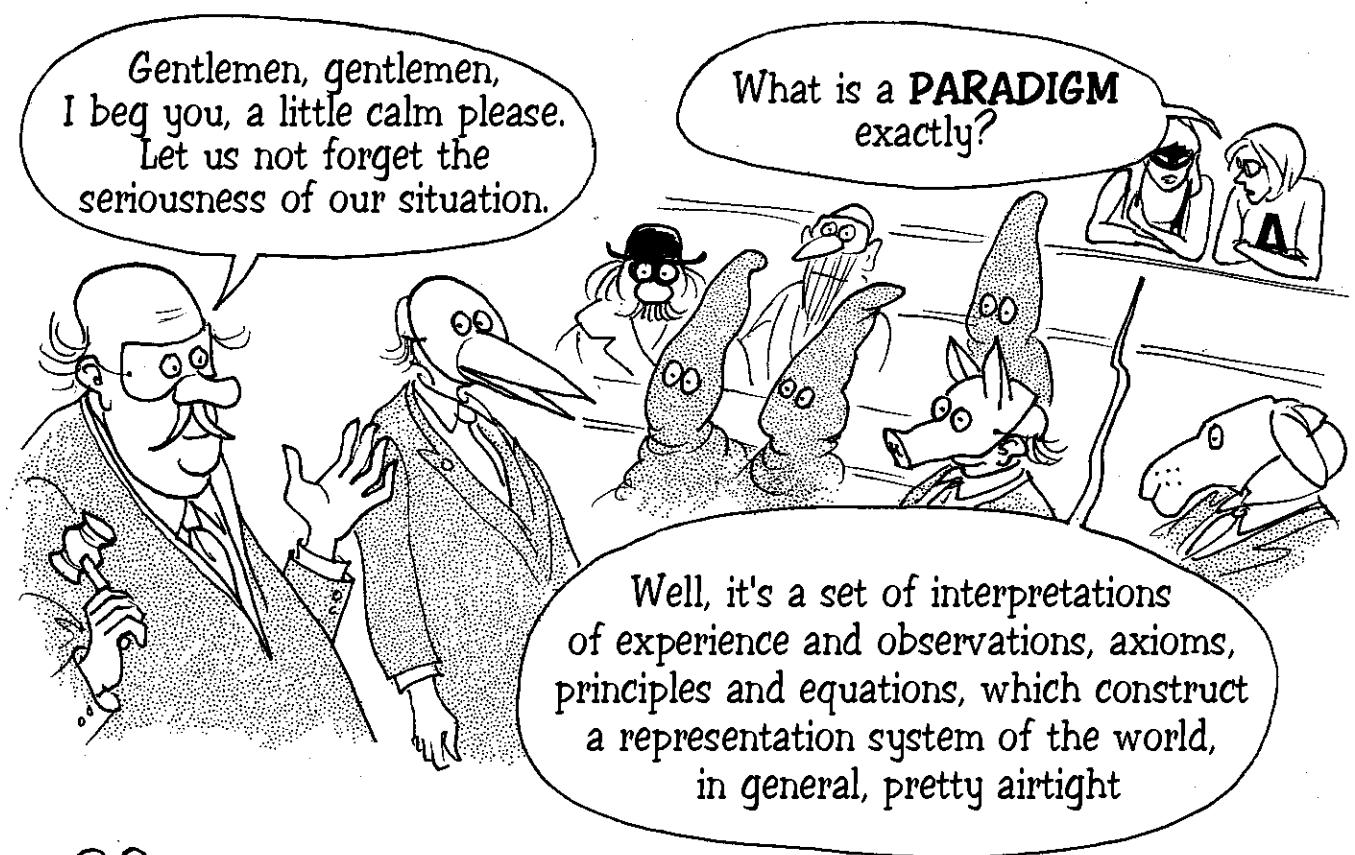
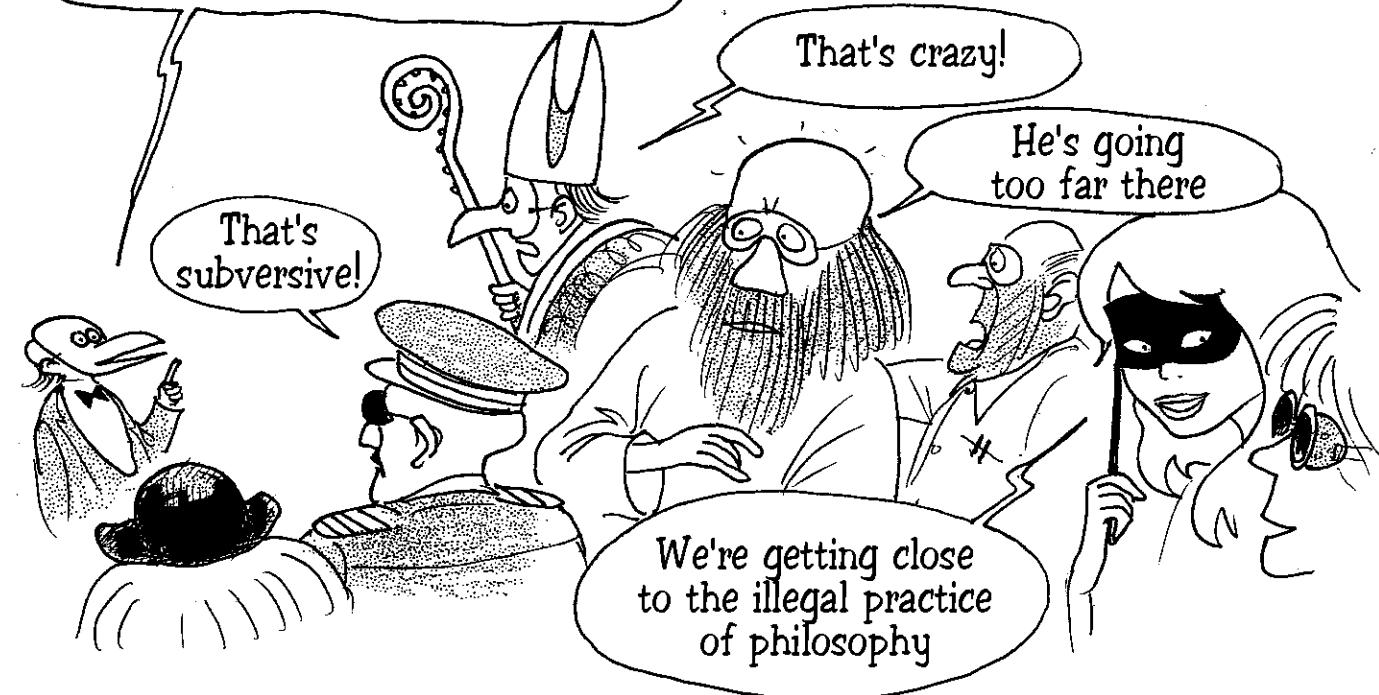
Because of the great variety of supports, the messages of the human species can be duplicated to the point where they are perceived by **THE ENTIRE SET OF INDIVIDUALS**



These language elements, memorised in writing, only code a part of human behaviour, in the form of customs, taboos, laws and beliefs, and are transmitted from generation to generation

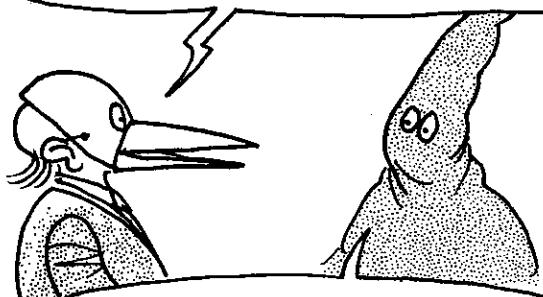


Our dialogue with the Universe is effected, and can only be effected, through an **ORGANISED SYSTEM OF BELIEFS**, in the form of religions, codified according to rites and spread through sermons; in the form of ideologies, articulated according to laws and spread by propaganda; or in the form of science, internally codified by paradigms and spread through scientific vulgarisation.

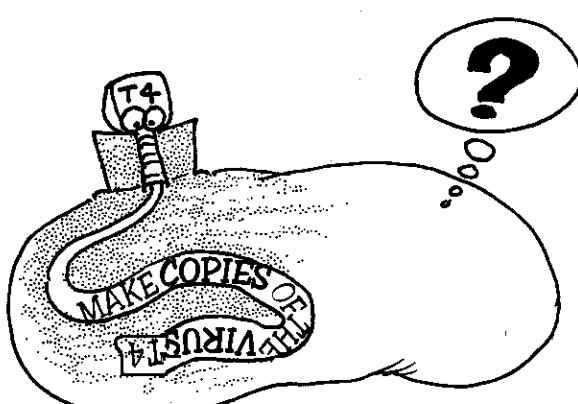


The language, and the representation system that evolves from that, is the binding agent of human society. Every perturbation affecting communication mechanisms can have very important repercussions.

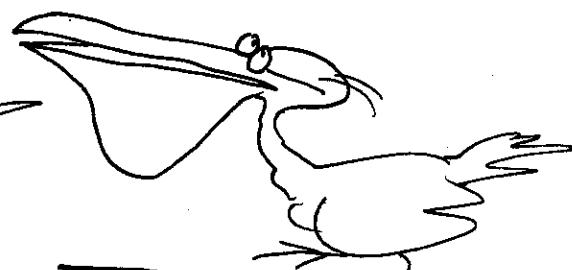
In biology, an alteration of DNA segments can translate into the appearance of malformations, dysfunctioning or cancer



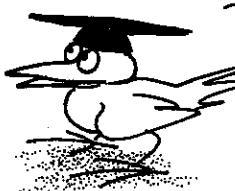
A **VIRUS** just injects an order, a parasitic phrase, which will incorporate itself into the "memory" of a bacteria.



A simple subversive idea can disorganise a society



But this inexplicable necrosis of our languages obliges us to create new words, **NEOLOGISMS**



How are new words made?



The most common method consists of using elements, prefixes or suffixes, borrowed from various existing languages

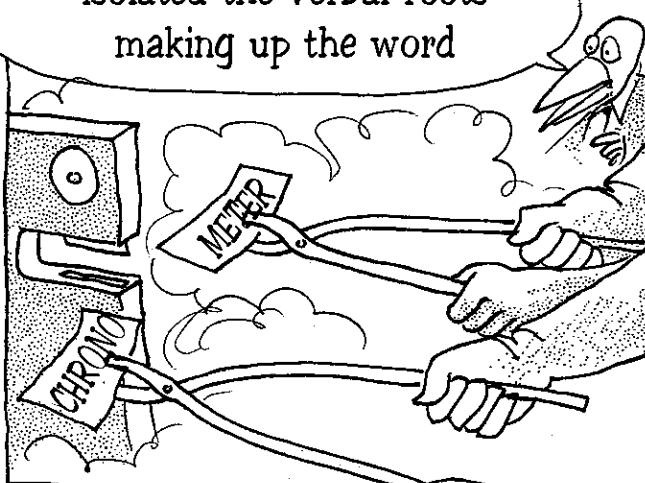
THE LOGOTRON

In the Logotronics laboratory, a section of the National Institute of Literatronics



As you can see here, in these perfectly aseptic conditions our technicians have very carefully extracted a word from the dictionary.

...now they have just isolated the verbal roots making up the word

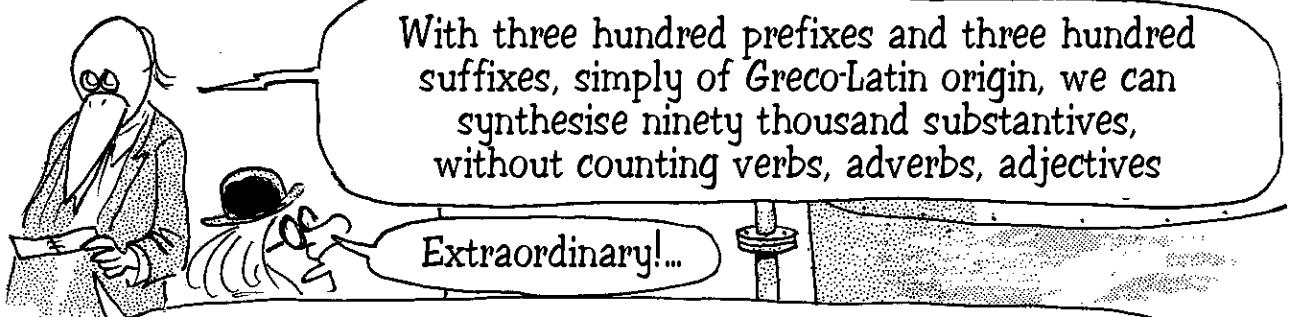


In linguistic reactors these elements are subsequently recombined with other elements



With three hundred prefixes and three hundred suffixes, simply of Greco-Latin origin, we can synthesise ninety thousand substantives, without counting verbs, adverbs, adjectives

Extraordinary!



So LOGOTRONICS has allowed us to discover a practically unexploited lexicological mine

Obviously this potential exceeds the usual needs of a language. But it isn't sufficient to just create words, they also need to have **MEANING**.

Of course...

SEMANTICS

Our specialistS in the French Academy are working without rest to give these neologisms a signification that allows them to be placed in the dictionary

VISIOSCOPE

SONOPHONE

But certain words, such as those made by uniting two identical roots, taken from Greek or Latin for example, cannot receive a precise meaning

They are therefore very carefully destroyed

GERONTOMACHY
Fight of old people

COSMOPHOBIST
Who cannot bear the Universe

MESOGRAPHY
To write between the

PANPHOBIA
Fear of everything

PALEOGAMOUS
Which reproduces in an ancient fashion

PSEUDOCRAT
Without real authority

BRACHYCERCAL
With a short tail

LASTOZOAIRE
Slug

HELIORRAGE
Solar eruption

Visioscope

The NLI, the National Literatronics Institute, has undertaken the controlled emission of several new words, which we will now present...



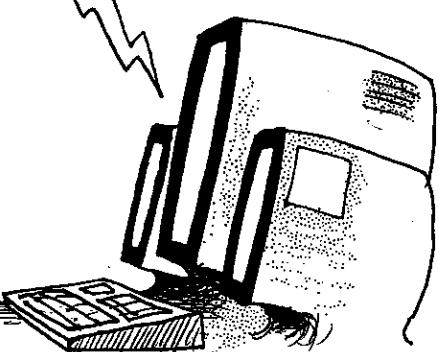
Erm.. Excuse me, a piece of late news: the plans for the **LOGOTRON** have been stolen from the NLI by a German anarcho-linguist group. This is the incredible explanation for the emission of new words by the Germans despite the repeated warnings of the ILF, the International Linguistics Foundation

Ah, it had to happen sooner or later!

LOGORRHEA, verbal inflation, threatens our neighbours across the Rhine. Normal conversations in German have become interminable. Television channels have had to suspend the weather forecast for the following day as the bulletin now exceeds twenty four hours



How many words can be produced by the Logotron?



The German government has warned its population against words of more than sixteen letters, which should now be considered as doubtful.



Almost without limit...

Here we see a Bavarian receiving the eleven volumes of the new dictionary

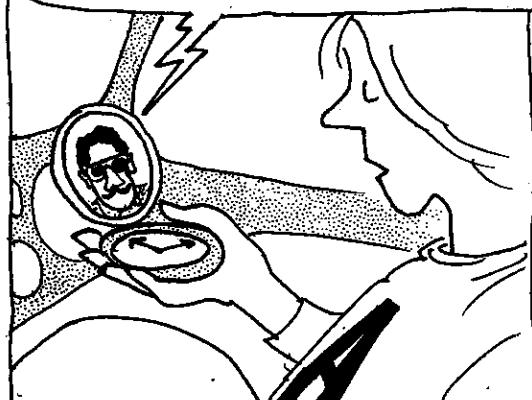


Language has its own life. If structures with two roots are formed, in their turn they can capture a new radical and give birth to a structure with three roots, etc...

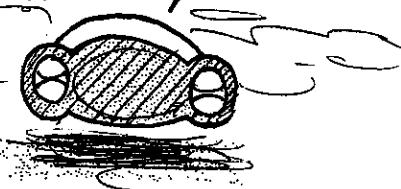


Something particular to agglutinative languages

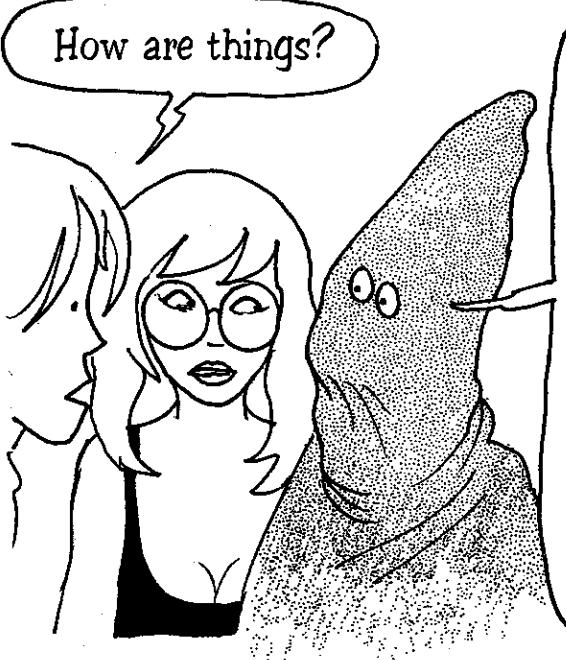
The NLI has therefore worked night and day to give new, ready-to-use words to French, that is to say ones that have a meaning. Rumours according to which **WORDS WITHOUT MEANING** have been put into circulation are without foundation



They are trying to reassure public opinion



HAVE CONFIDENCE IN THE NLI, THE PRECISE WORD STILL EXISTS



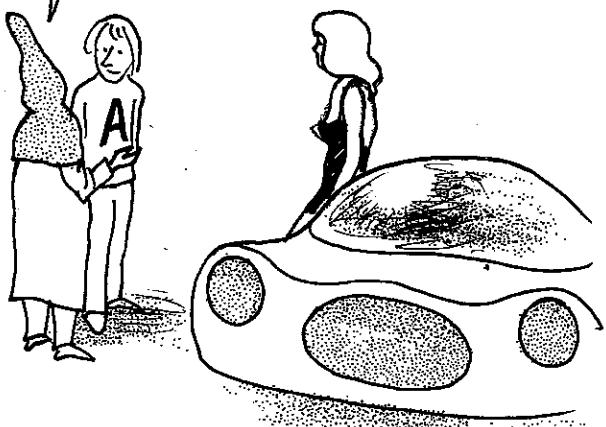
How are things?

Not good. In Germany they've reached sixty million words. In Munich and Dresden people are speaking French and Italian. There is a danger that the German language, despite active support from the ILF (International Linguistic Foundation) which has taken the courageous decision to publish its bulletin in German

People have lost confidence.
They say that there will never be as
many objects as there are words



Two theses have appeared.
According to the first, there is no reason
to worry: language **CREATES** objects,
and a readjustment will happen
sooner or later.



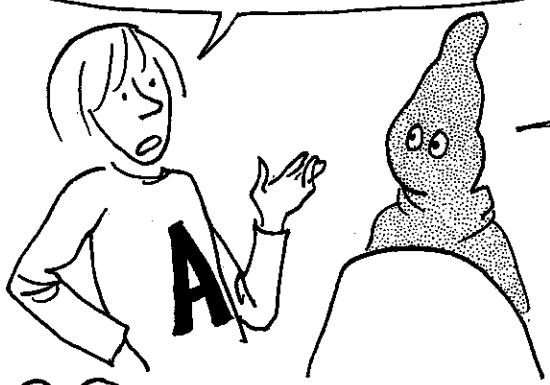
The other thesis is that
objects do not exist.
Only language exists...

As for the Japanese language,
it is affected by a particular form
of **LOGOSIS**, a terrible **SEMANTIC**
DRIFT. Words even manage
to change their meaning
during a conversation.

Language is a
rotten plank
SHUT UP



Is there no language that has
escaped this planetary logosis?

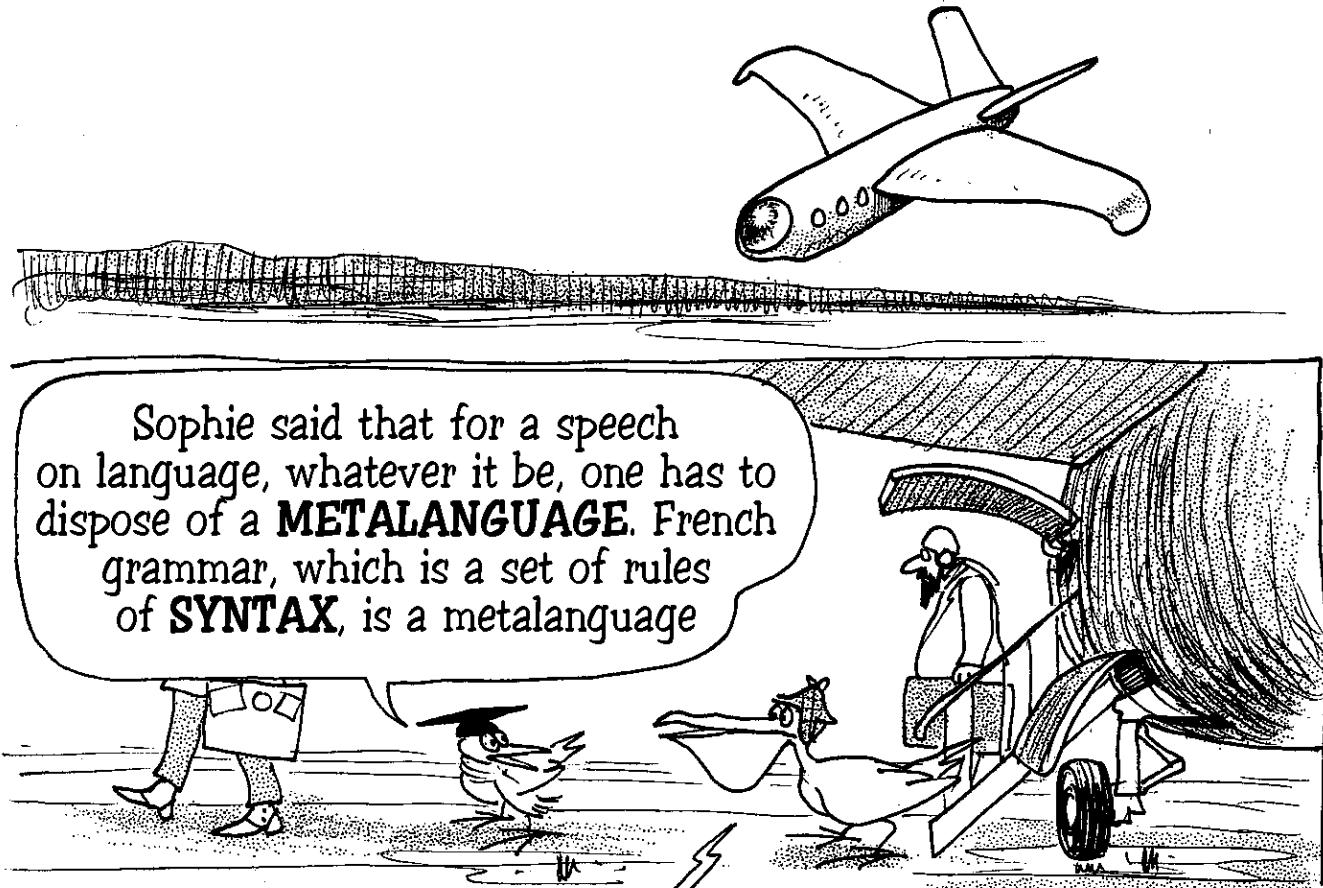


For an unexplained reason
it seems that southern Finnish has,
provisionally, remained more or less
intact. If a speech on speech can be
given, this language remains our last
chance. Do you speak Finnish?

Of course

LANGUAGE AND METALANGUAGE

Somewhere in Finland

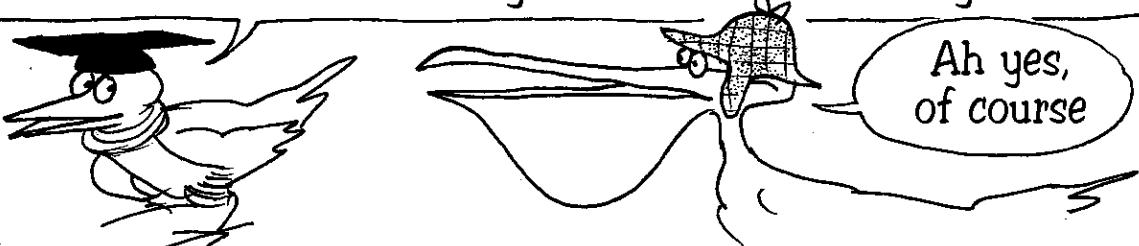


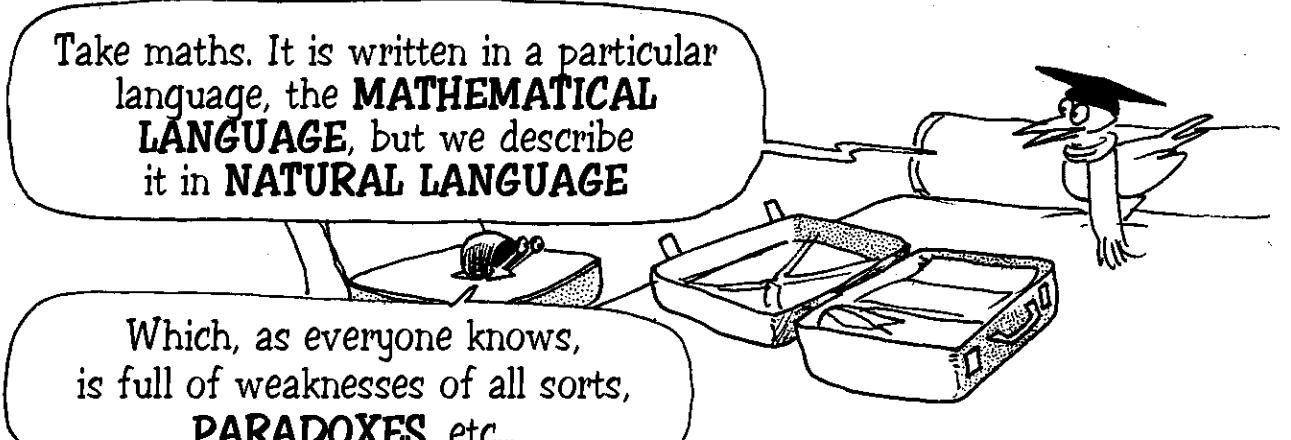
Sophie said that for a speech on language, whatever it be, one has to dispose of a **METALANGUAGE**. French grammar, which is a set of rules of **SYNTAX**, is a metalanguage

But isn't grammar written in terms which form an integral part of the French language?

In such a case the language contains the metalanguage. But this isn't always the case: English people who learn French use a French grammar written... in English

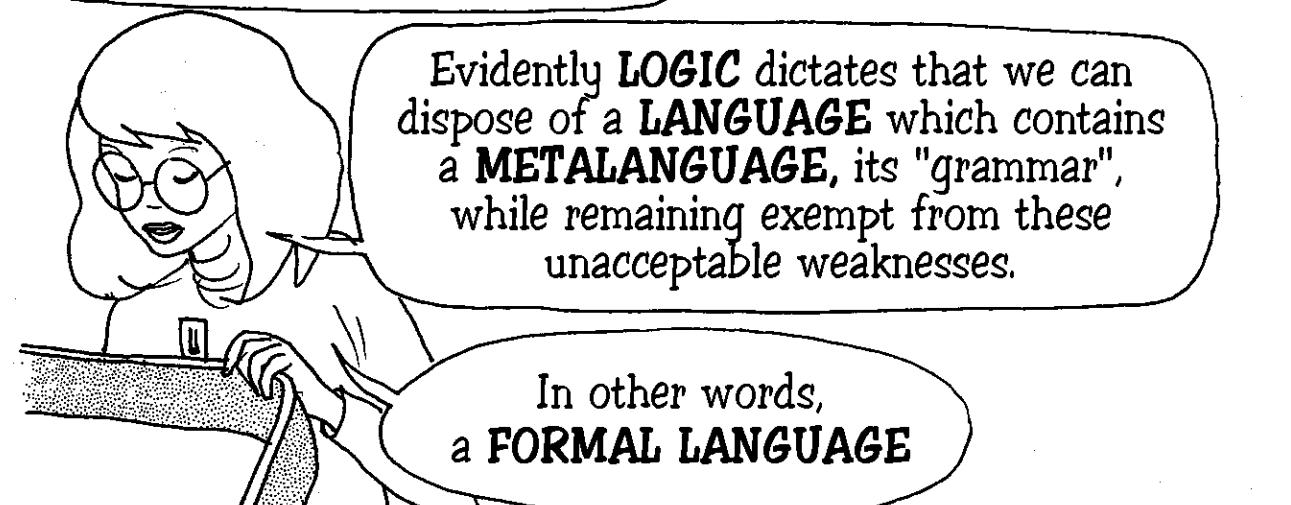
Ah yes,
of course





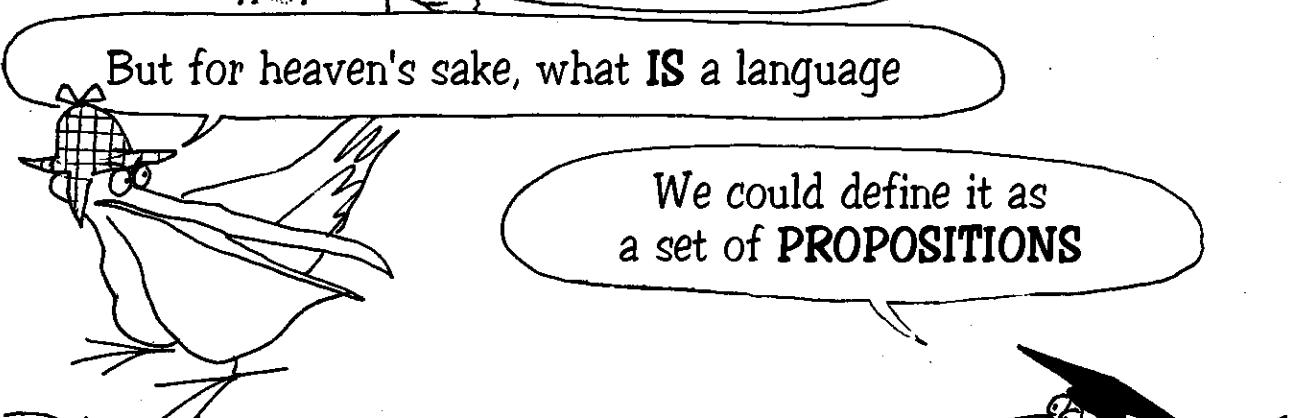
Take maths. It is written in a particular language, the **MATHEMATICAL LANGUAGE**, but we describe it in **NATURAL LANGUAGE**

Which, as everyone knows, is full of weaknesses of all sorts, **PARADOXES**, etc...



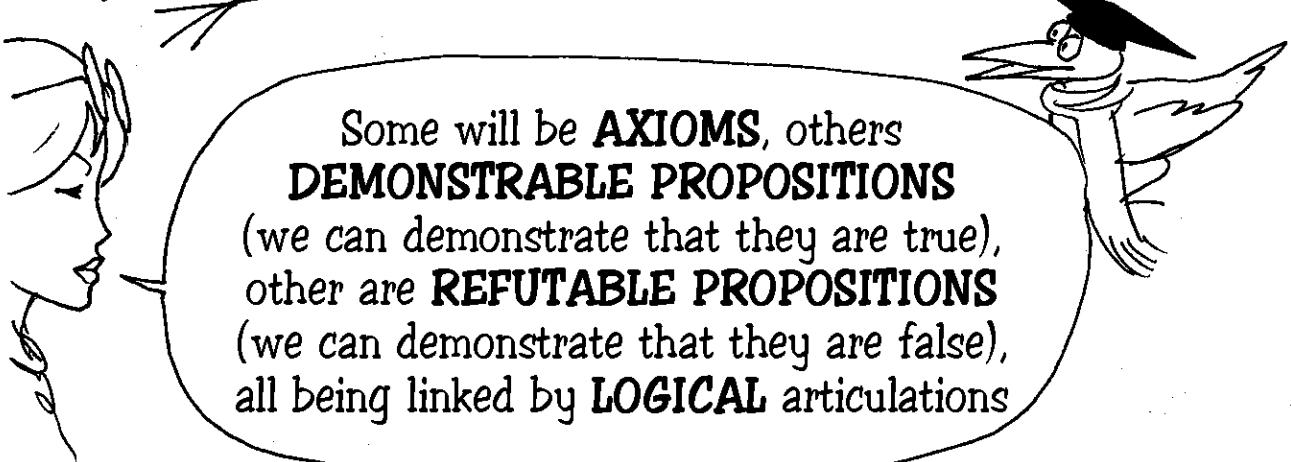
Evidently **LOGIC** dictates that we can dispose of a **LANGUAGE** which contains a **METALANGUAGE**, its "grammar", while remaining exempt from these unacceptable weaknesses.

In other words, a **FORMAL LANGUAGE**

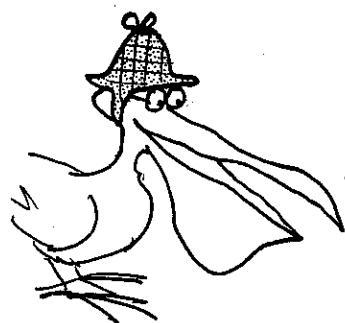


But for heaven's sake, what **IS** a language

We could define it as a set of **PROPOSITIONS**



Some will be **AXIOMS**, others **DEMONSTRABLE PROPOSITIONS** (we can demonstrate that they are true), other are **REFUTABLE PROPOSITIONS** (we can demonstrate that they are false), all being linked by **LOGICAL** articulations



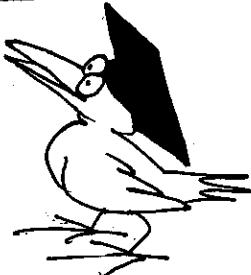
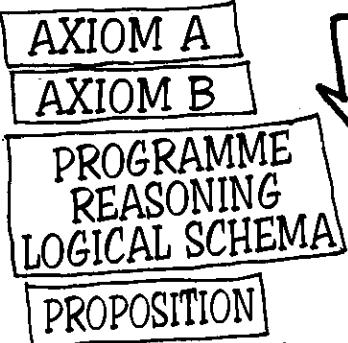
It suffices to be able to dispose of such a formal language, which will then serve as a basis, as a universal language for all the others



This is exactly what we tried to prove through the language of **SET THEORY** and you saw what that gave

As for mathematicians...

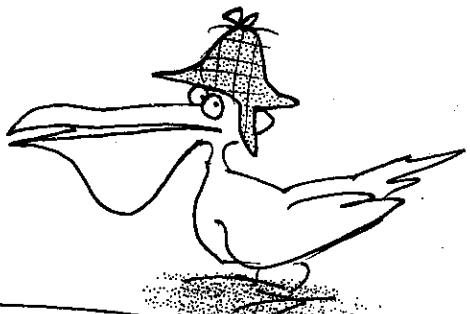
Let's see, a formal system is composed of objects of a language. Some are **AXIOMS**, comparable to the **DATA** of a **PROGRAMME**. From the inherent **LOGIC** of this language, which is also a piece of data, we can develop reasonings, comparable to **PROGRAMMES**, whose outcome is new **PROPOSITIONS**



For a language to be consistent all that must form part of the same set, the **LANGUAGE OBJECT**, and any proposition extracted from this set is an **AXIOM**, a logical reasoning, or a **DEMONSTRABLE** or **REFUTABLE PROPOSITION**

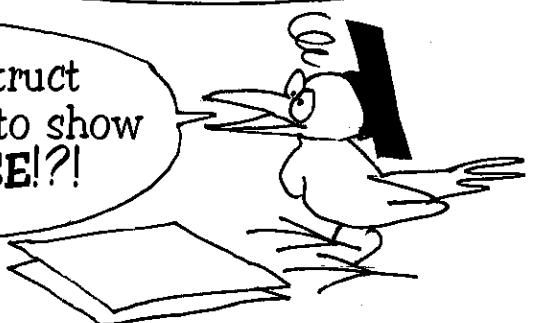
LANGUAGE- OBJECT

But what if it isn't either an axiom, a reasoning, a demonstrable or a refutable proposition?



You well know that it is those annoying **UNDEMONSTRABLE PROPOSITIONS** such as: **THE BARBER WHO SHAVES EVERYONE WHO DOES NOT SHAVE THEMSELVES**, and exclusively those, belongs to the set of men who do not shave themselves

Ah yes, we cannot construct a reasoning that allows us to show that it is **TRUE** or **FALSE**!?

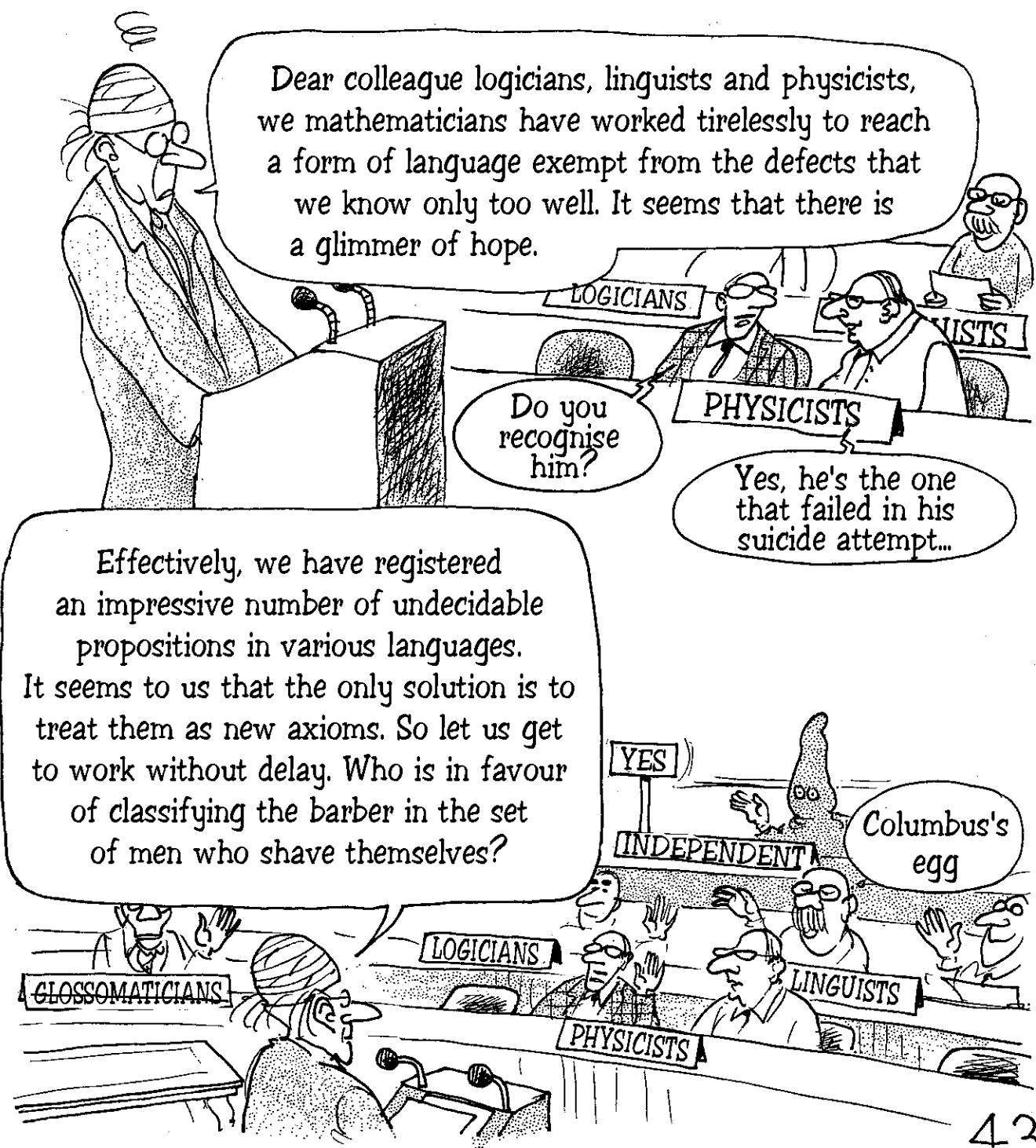


OK. I think we shouldn't panic. We are here to try to get the language out of these dramatic blind alleys. I see communications listed on the conference programme that have encouraging titles. We'll see about it tomorrow



GÖDEL'S THEOREM

The symposium began in a very tense atmosphere, in this region of Europe provisionally spared from the wave of anarcholinguistic terrorism.



It is obviously a fair amount of work but by pooling our efforts, for example in an Institute of Axiomatics, attached to a Ministry for the retreatment of undecidable propositions, we can hope to rid our languages of undesirable objects.

And...

Alas, I'm afraid dear colleague, that this enterprise is futile

ARITHMETIC constitutes a **FORMAL SYSTEM**, a language composed of a certain number of elements. Whole numbers, then signs representing the various operations, the equals sign =, implication =>, negation, things such as \exists (it exists), \forall (for everything)... Add to that the **PEANO AXIOM**, and that's all

Yes I know, there exists a totally axiomatic presentation of arithmetic

You also know that there exists an undecidable proposition which is formulated according to the question: is 0 equal to 1? (*)

We are aware of this particularity Professor Gödel, but would it not be possible to include the proposition " $0=1$ ", considered as false, as a new axiom of **ARITHMETICAL THEORY**?

(*) As absurd as it may appear, in this axiomatic context it is impossible to demonstrate or refute the proposition " $0=1$ ".

Alas, my young friend, I have noticed that if we include a new axiom "zero is not equal to one", this will immediately produce a new undecidable proposition, and so on...

That's truly frightening!

It is therefore impossible that arithmetic will ever become a **COMPLETE CONSISTENT THEORY**, the proposition " $0=1$ " must be considered as **ESSENTIALLY UNDECIDABLE**

That's a pity.
But there isn't
only arithmetic.

Couldn't a solution be the total suppression of zero, the cause of all our problems?

Bernie,
these people
are mad

PHYSICISTS

Alas...

The propositions of a language are associable with whole numbers in a biunivocal manner and this world of numbers immediately communicates this essential undecidability to them.

Professor Godel,
I cannot believe this

This essential defect, like original sin, pre-exists in **ALL** languages therefore, in the natural language, in mathematics...

Take for example the natural language constructed from signs like the letters of the alphabet and let us consider the series of **PRIME NUMBERS**, except 1: 2, 3, 5, 7, 11, 13, 17, 19, 23 etc...

We will consider the letters themselves as propositions and assign a number to them. We will assign 2^1 to a, the first letter, $2^2 = 4$ to b, the second letter, $2^3 = 8$ to c, and so on



$a \Leftrightarrow 2^1 = 2$
$b \Leftrightarrow 2^2 = 4$
$c \Leftrightarrow 2^3 = 8$
$d \Leftrightarrow 2^4 = 16$
$e \Leftrightarrow 2^5 = 32$
$f \Leftrightarrow 2^6 = 64$
$g \Leftrightarrow 2^7 = 128$
$h \Leftrightarrow 2^8 = 256$
etc.

Let us now move on to a series of characters such as b-a-e. This time we will base our coding on the series of prime numbers, beginning with 3, that is to say 3, 5, 7 etc... The number associated with the letter b being 4, with the letter a, 2 and the letter c, 8, we form the whole number $n = 3^4 5^2 7^8$ which equals 11 673 722 025, already high. I say that this whole number codes perfectly the series of letters b-a-e

Understood! This number is **DECOMPOSABLE IN A UNIQUE WAY** according to the product of whole powers of prime numbers. Which makes it that from $n = 11 673 722 025$ we return to the product $3^4 5^2 7^8$. We can then decompose the exponents

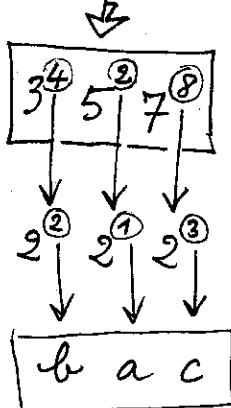


By what miracle
for goodness' sake?

Take this number, which equals 11 673 722 025. If you divide it by prime numbers again and again, until it is no longer possible, you obtain a decomposition according to a product of the whole powers of prime numbers. Here $3^4 5^2 7^8$. This decomposition is **UNIQUE**

By taking the power of the first prime number of the series, 3^4 , and in considering this exponent as a power of 2, we find the rank of the first character of the word, that is 2, which corresponds to the letter b

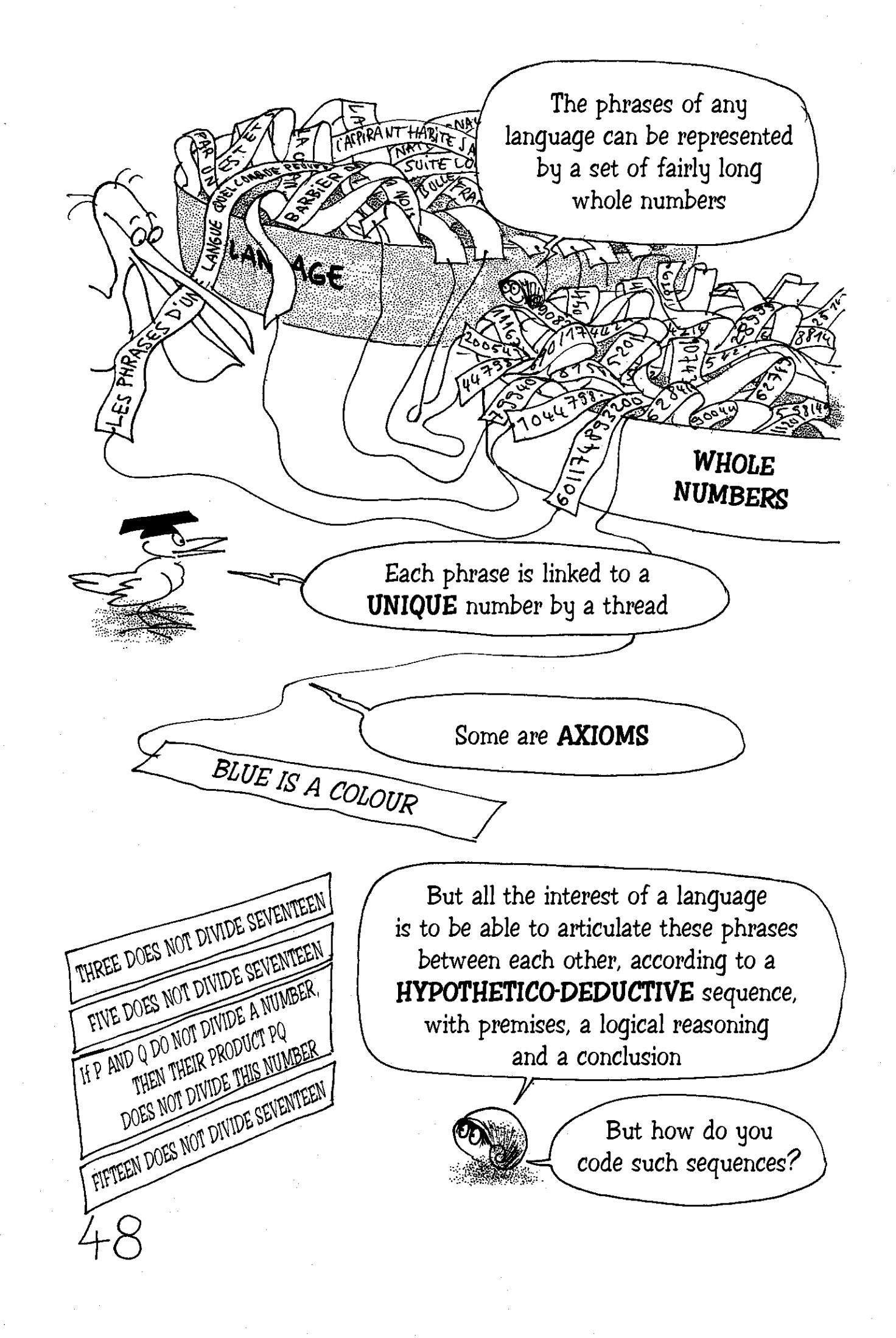
1167322025



By this method of coding, the number 11 673 722 025 represents the word bae and only that

THREE DOES IN

By coding the "space" between the words, or punctuation, we can associate a number with a series of words, with a whole phrase



The phrases of any language can be represented by a set of fairly long whole numbers

Each phrase is linked to a **UNIQUE** number by a thread

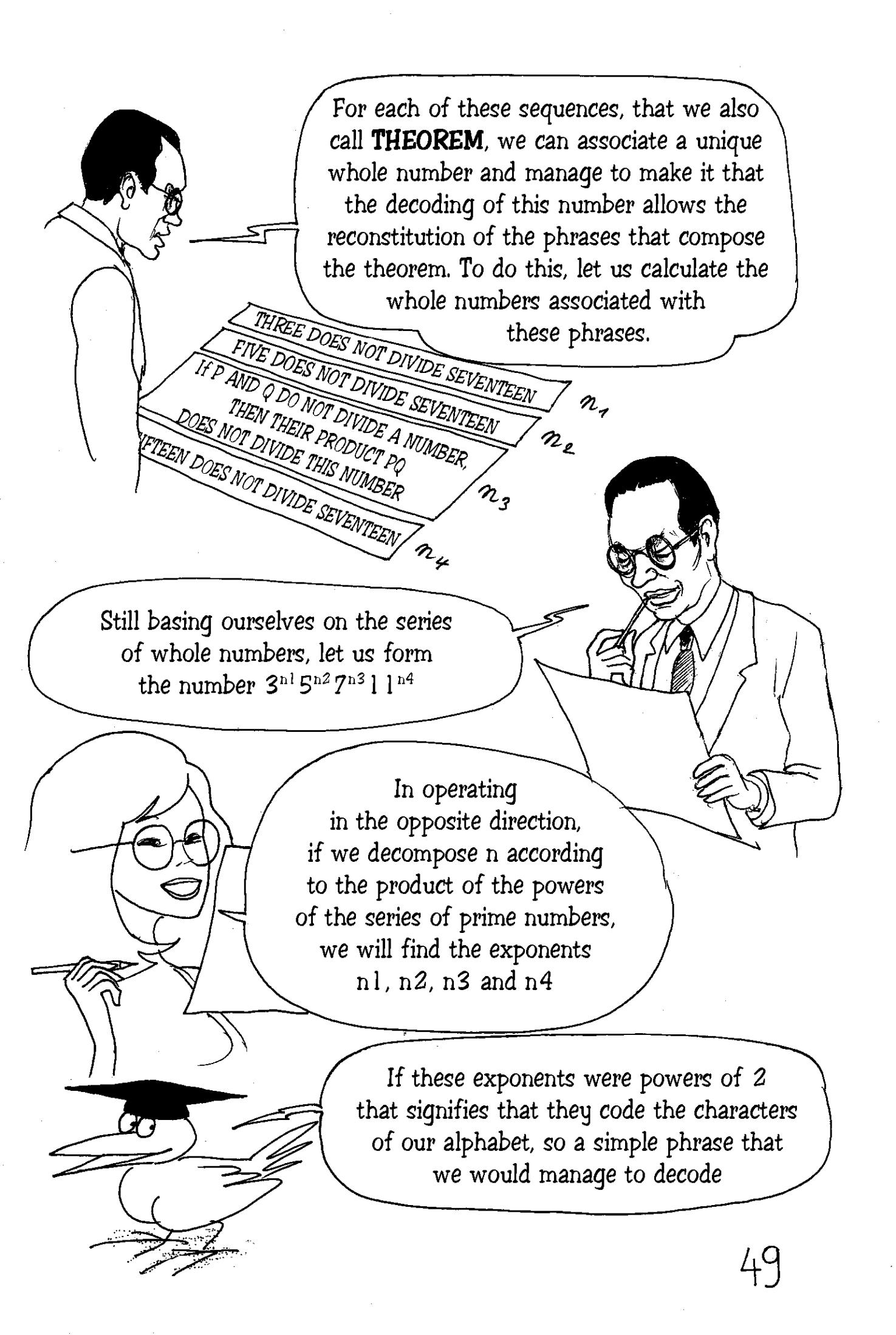
Some are **AXIOMS**

BLUE IS A COLOUR

But all the interest of a language is to be able to articulate these phrases between each other, according to a **HYPOTHETICO-DEDUCTIVE** sequence, with premises, a logical reasoning and a conclusion

But how do you code such sequences?

THREE DOES NOT DIVIDE SEVENTEEN
FIVE DOES NOT DIVIDE SEVENTEEN
IF P AND Q DO NOT DIVIDE A NUMBER,
THEN THEIR PRODUCT PQ
DOES NOT DIVIDE THIS NUMBER
FIFTEEN DOES NOT DIVIDE SEVENTEEN



For each of these sequences, that we also call **THEOREM**, we can associate a unique whole number and manage to make it that the decoding of this number allows the reconstitution of the phrases that compose the theorem. To do this, let us calculate the whole numbers associated with these phrases.

THREE DOES NOT DIVIDE SEVENTEEN n_1
FIVE DOES NOT DIVIDE SEVENTEEN n_2
IF P AND Q DO NOT DIVIDE A NUMBER,
THEN THEIR PRODUCT PQ
DOES NOT DIVIDE THIS NUMBER n_3
FIFTEEN DOES NOT DIVIDE SEVENTEEN n_4

Still basing ourselves on the series of whole numbers, let us form the number $3^{n_1} 5^{n_2} 7^{n_3} 11^{n_4}$

In operating in the opposite direction, if we decompose n according to the product of the powers of the series of prime numbers, we will find the exponents n_1, n_2, n_3 and n_4

If these exponents were powers of 2 that signifies that they code the characters of our alphabet, so a simple phrase that we would manage to decode

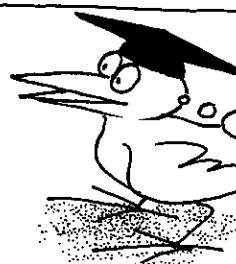


If the exponents n_1, n_2, n_3 and n_4 are not powers of 2 then they are phrase-elements of a hypothetico-deductive sequence, of a theorem. In continuing this decomposition a second time we reconstruct the phrases.



So everything can fit into a **LANGUAGE-OBJECT** which is composed entirely of whole numbers. Everything, the axioms, the rules, the reasonings and the propositions

Everything can be brought down to a **GAME OF NUMBERS**



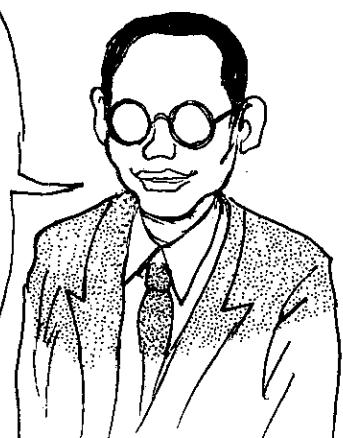
So to a perfectly diabolic **ARITHMETIC**...!

There's something I don't fully understand. If we use whole numbers to code all signs, characters, phrases and theorems, what place is left for the whole numbers themselves?

Inversely, how, at the same time, can we fit into the same numeric set whole numbers, axioms and the ARITHMETICAL theorems that refer to them? Do the numbers take all the available space?

Careful! Numbers themselves are coded with the help of this prime number gadget. In arithmetic we could quite easily code characters as powers of 2.

$$\begin{aligned} \forall &\leftrightarrow 2^1 = 2 \\ \exists &\leftrightarrow 2^2 = 4 \\ &\vdots \quad \vdots \\ 1 &\leftrightarrow 2^5 = 32 \\ 2 &\leftrightarrow 2^6 = 64 \\ &\text{etc...} \end{aligned} \quad \begin{cases} \text{Logical operators} \\ \text{Figures} \end{cases}$$





It's this transcoding by shifting until **INFINITY** which lets us lodge in the set (infinite) not only whole numbers themselves but also the arithmetical rules that link them together



And in **INFINITY**, that's certain, there is no shortage of room

For a language to be **CONSISTENT**, for it to form a **COMPLETE THEORY**, the objects of a language need to be made up of **AXIOMS**, considered as **LANGUAGE DATA**, either **RULES** (syntactic), or **SOFTWARE** elements, or **PROPOSITIONS** resulting in **HYPOTHETICO-DEDUCTIVE** cascades

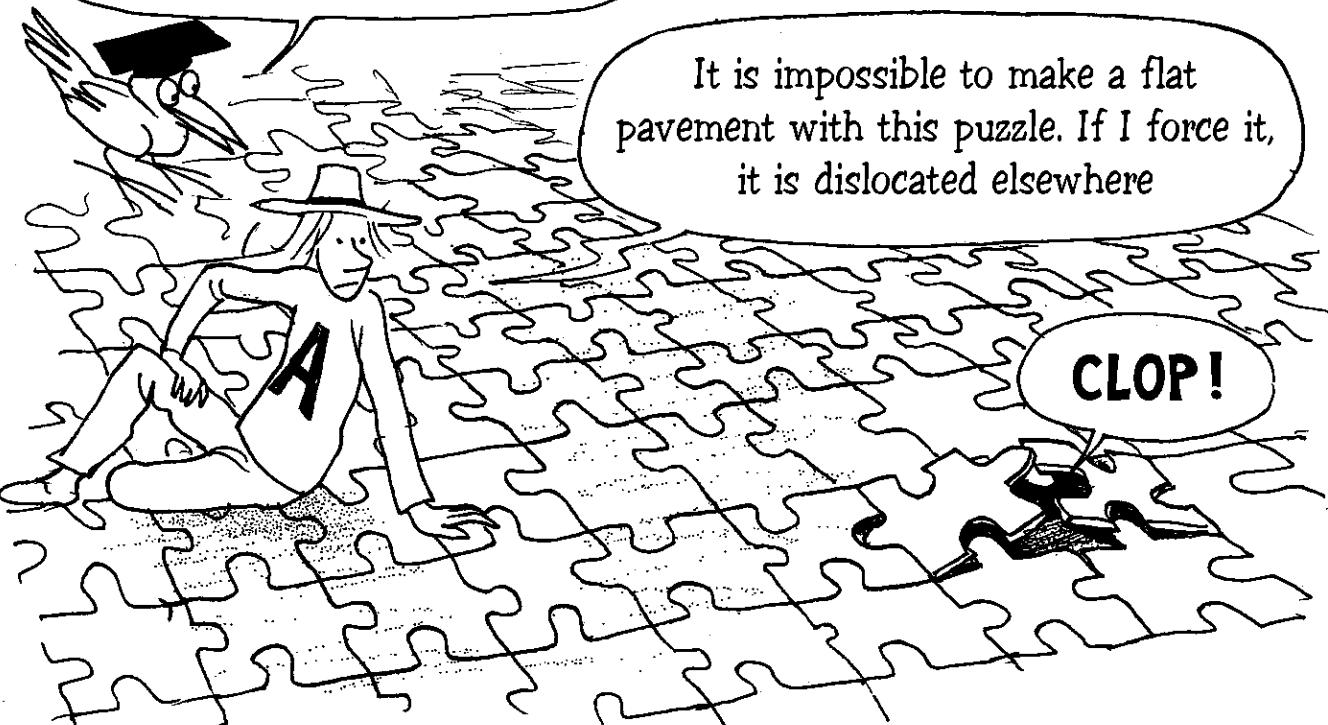
And this wish applies to **ALL LANGUAGES**, including the **MATHEMATICAL LANGUAGE**

But **UNDECIDABLE PROPOSITIONS** exist, ones that we can **NEITHER DEMONSTRATE NOR INVALIDATE**

Which are neither axioms, nor rules, but which we cannot hook on to any hypothetico-deductive sequence.

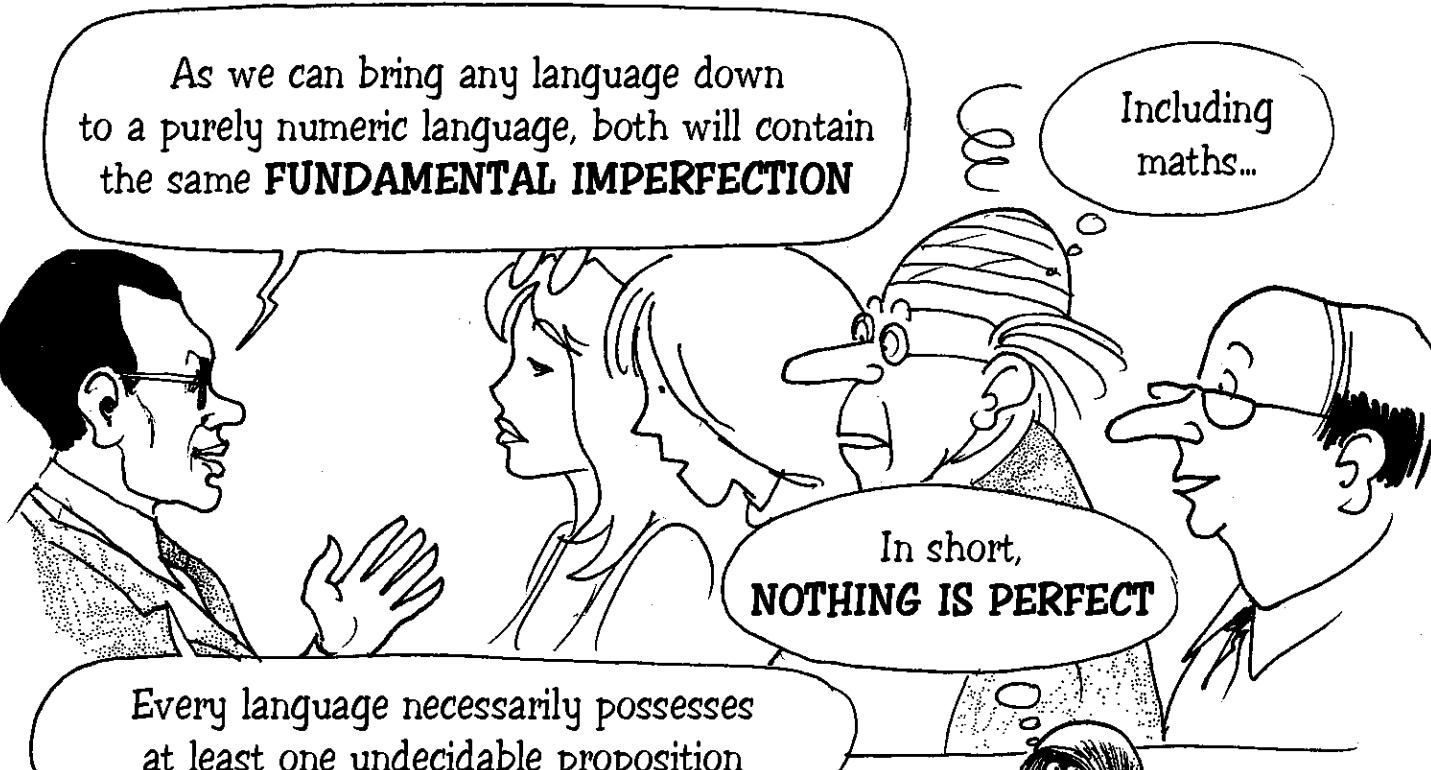


Gödel has shown, in the case of arithmetic, that if we try to get out by considering the undecidable proposition " $0=1$ " as an axiom, this will immediately create another undecidable proposition, and so on, indefinitely.



It is impossible to make a flat pavement with this puzzle. If I force it, it is dislocated elsewhere

CLOP!



As we can bring any language down to a purely numeric language, both will contain the same **FUNDAMENTAL IMPERFECTION**

Including maths...

In short,
NOTHING IS PERFECT

Every language necessarily possesses at least one undecidable proposition

Tell me dear colleague, all this seems like a bad dream.
There must be a way out. Don't prime numbers depend on... er...
the BASE, the number system used?

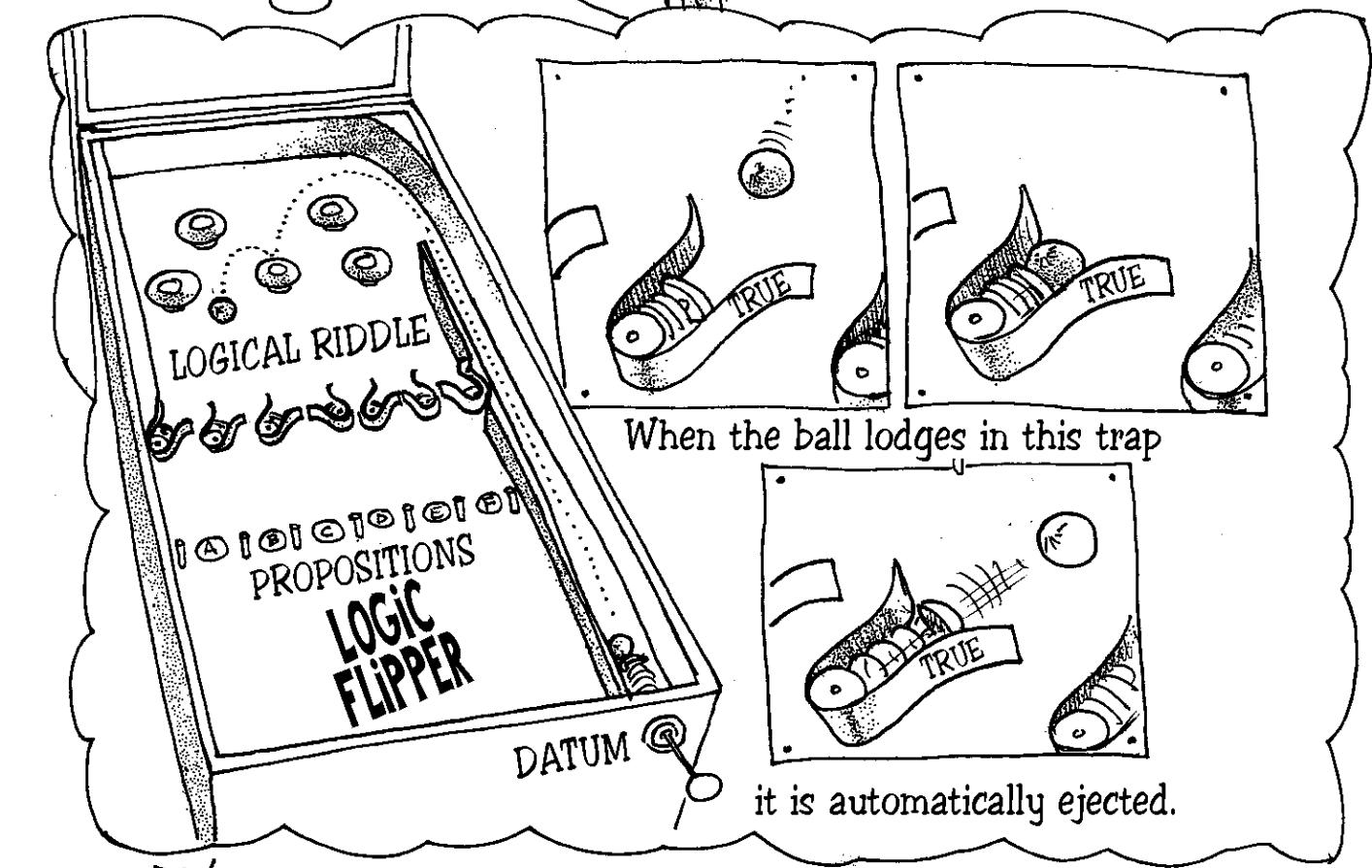
Alas not.
We could even code everything
in **BINARY**, made up of just
0s and 1s

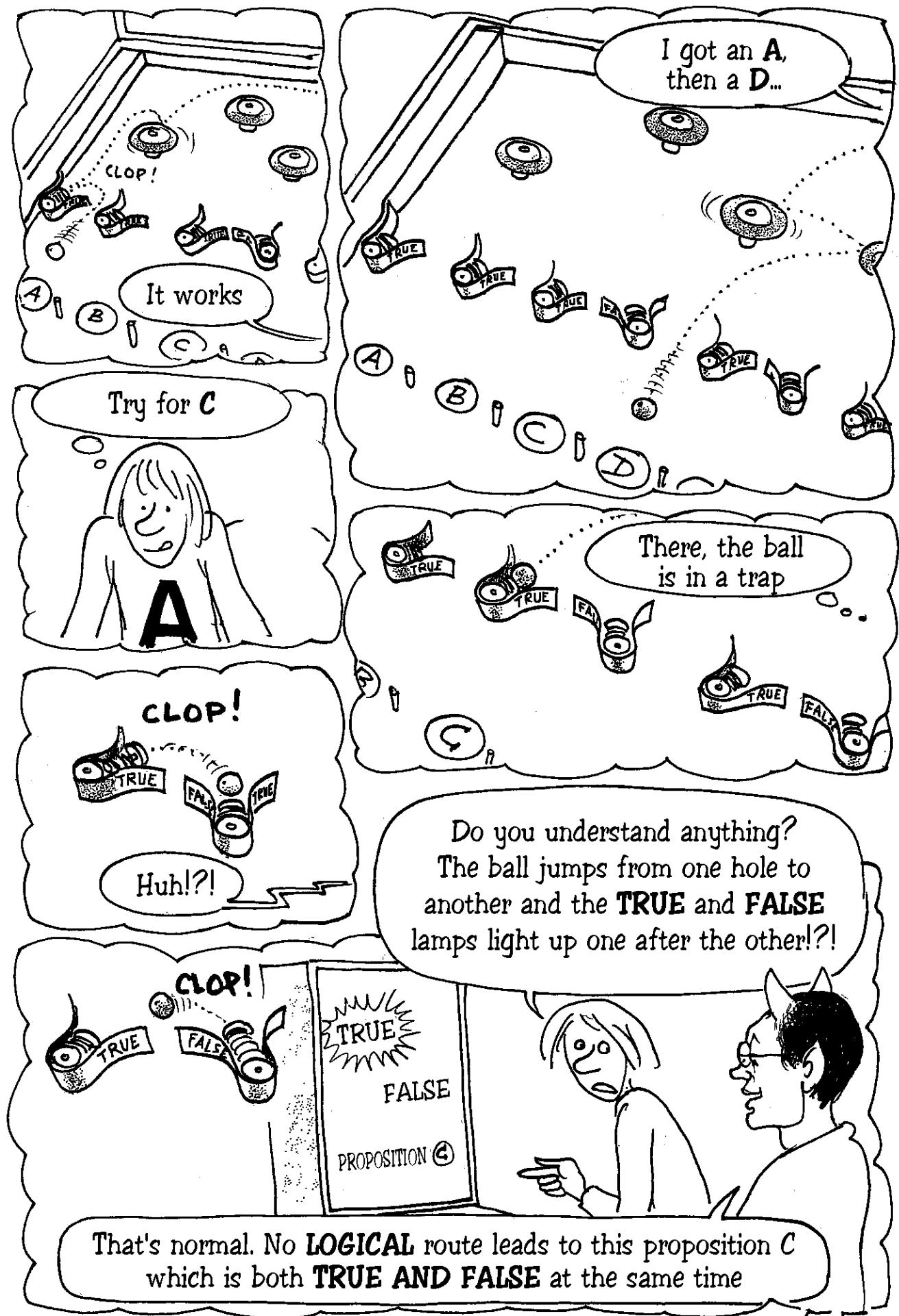
How
awful!

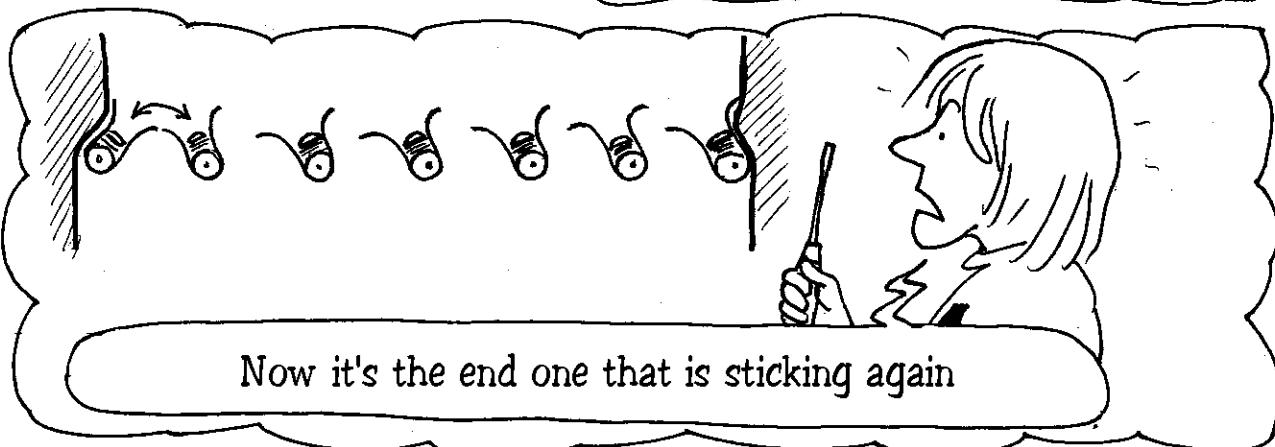
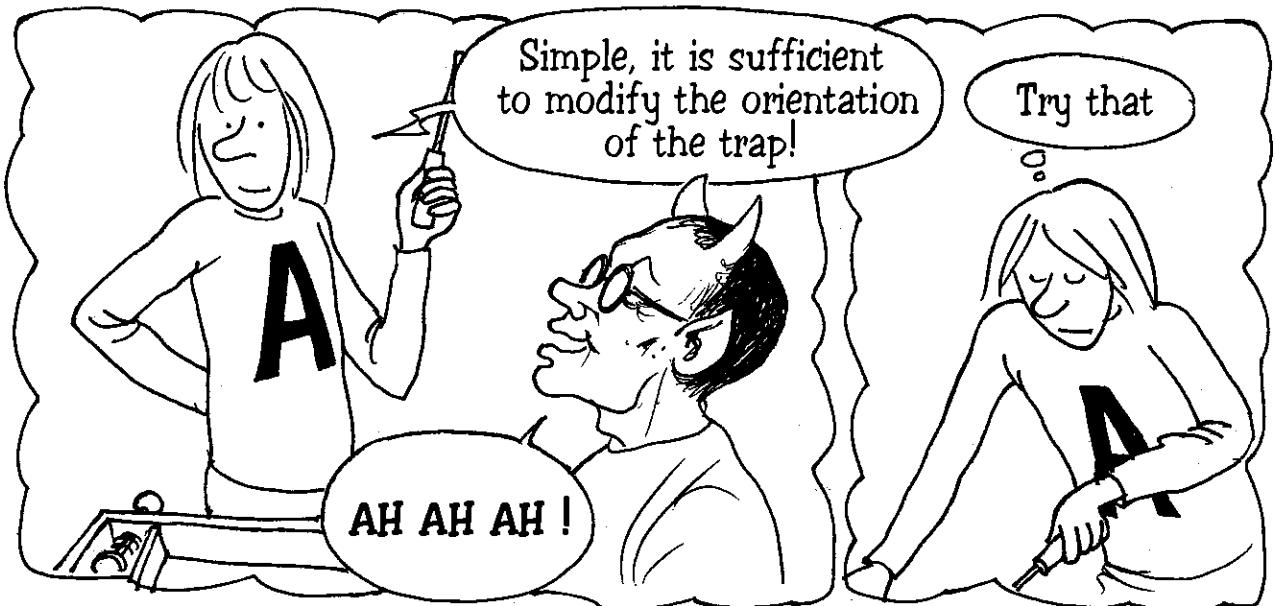
So whole numbers are not a particular language, they **ARE THE LANGUAGE**.
All the rest is just a **READING** of it.

Because there is
something else besides
numbers!?

TRUTH
depends on
LANGUAGE,
the way in which we
code and decode

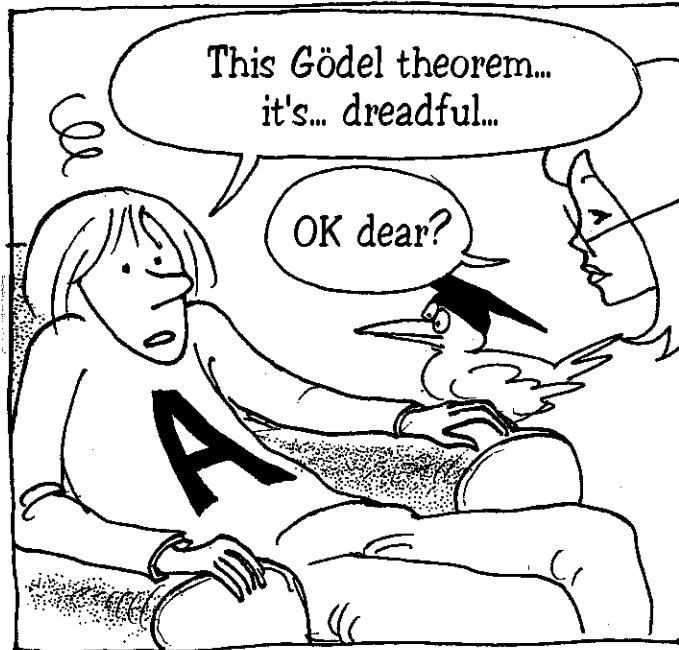




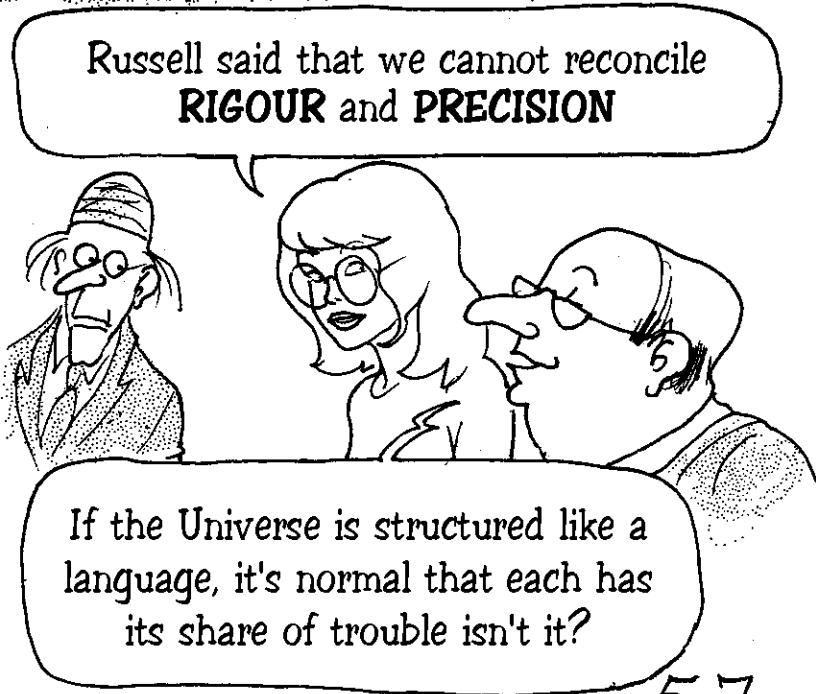
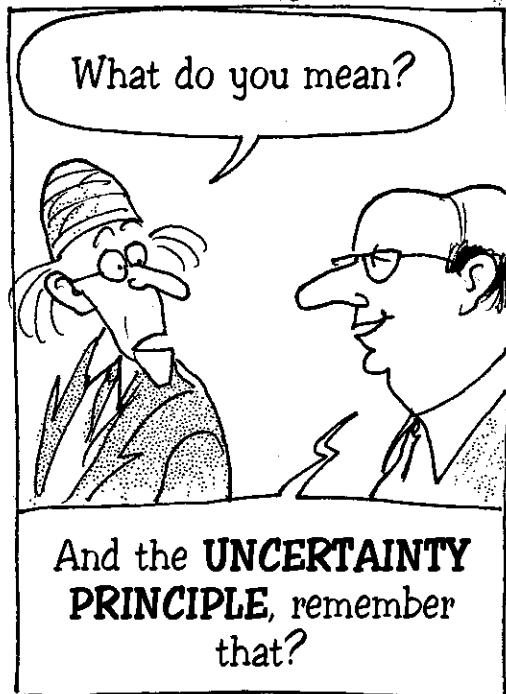


Heavens! Impossible to eliminate this logical trap. If I turn the trap, it only displaces the problem slightly





The symposium ended on this sad report...



The error is to want to negotiate **THOUGHT** through language

So what should we do?

Transcendental meditation allows one to be free of these constraints

Verbalised thoughts have their roots in the left hemisphere of the brain. By completely stopping this subordinate mental activity, we redistribute the oxygen flowing to the brain. This then goes to the right hand side, which functions in a different way, allowing man to accede to essential knowledge

That's not silly, what does it give?

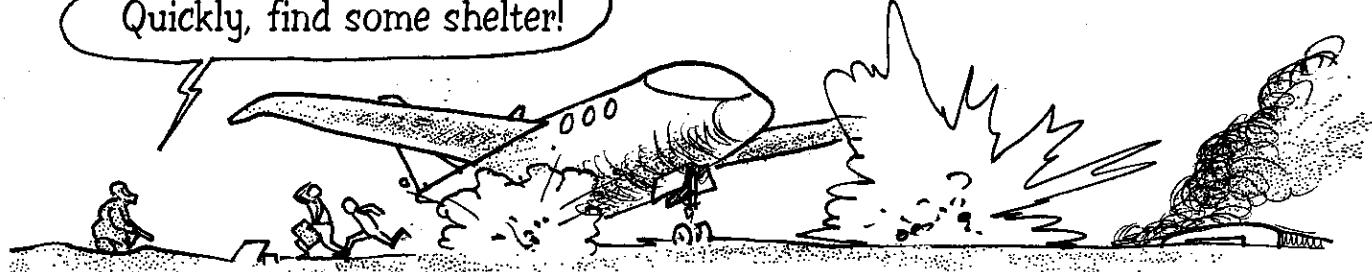
Unfortunately that is not **COMMUNICABLE**

But... It's the end of the profession!

Come on, we're going home

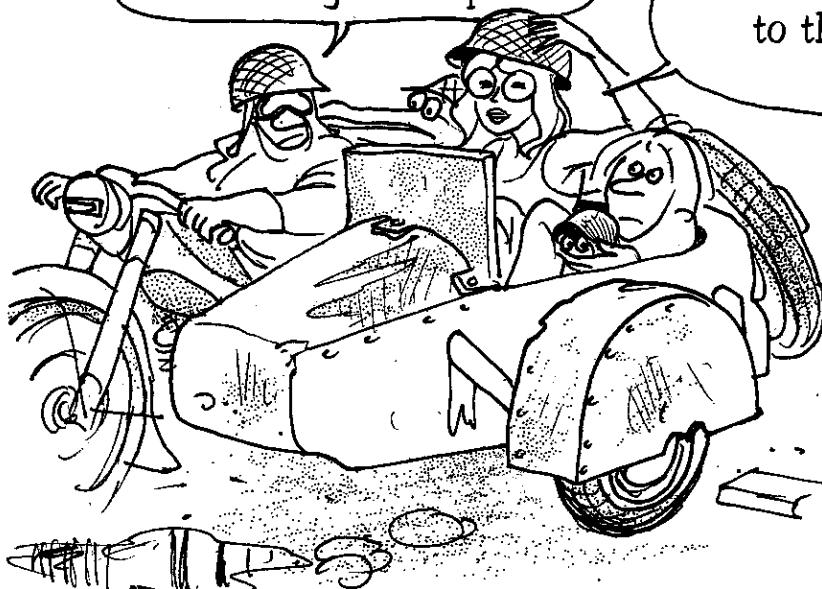
We're looking foolish...

Quickly, find some shelter!

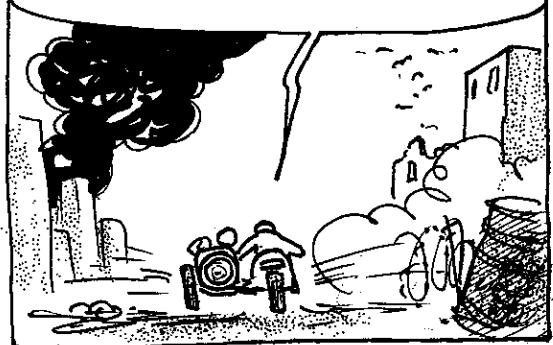


The mutists are attacking the airport

We must file a report to the Literatronics Institute



Or at least what remains of it...



NATIONAL
LITERATRONICS
INSTITUTE

Quickly!



We've had a very hard night.
The anarcholinguists are every
where. Your southern Finn won't
hold on for much longer. Now
there's a Finnish **LOGOTRON**

As it is an agglutinative
language (*), like German
or Japanese, it won't
be long now.

This is truly
a **LOGICIDE**

Oh, you can look
but all the pages
are blank

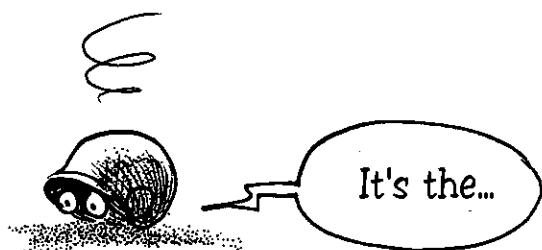
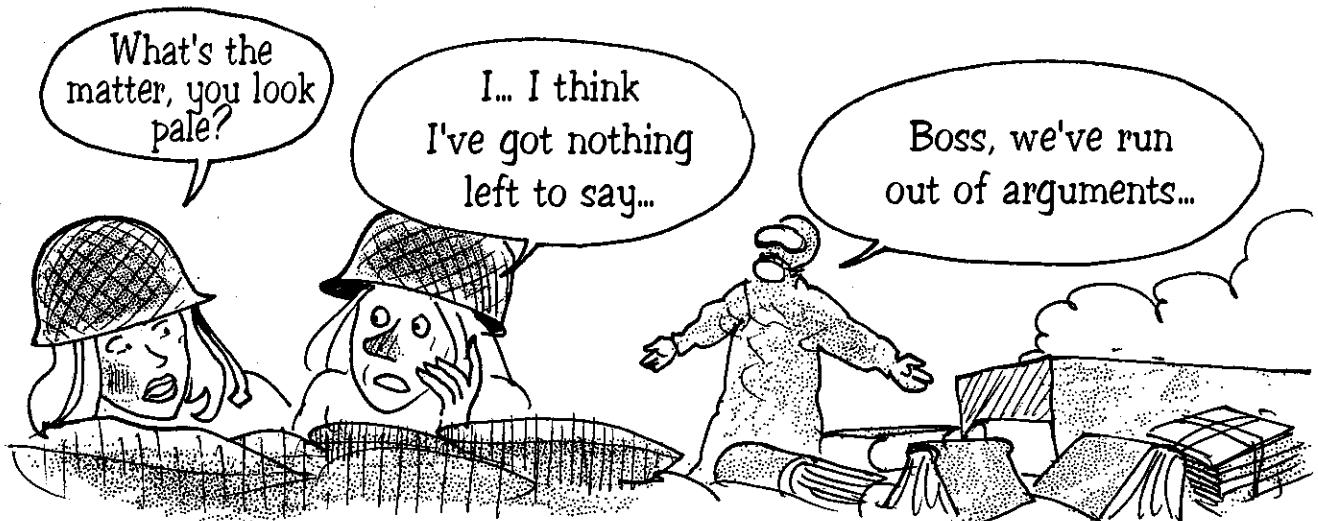
Look, library rats

They're
coming back!

It's a fundamentalist neo-computerist
sect which seeks to reduce the language
to just one word.

But who are
that lot?

(*) in which one can combine verbal roots to infinity.



END...

A big thank you to my friend MIHN for his irreplaceable contribution of magic dust, a key ingredient in the LANTURLU albums.

THE LOGOTRON GAME

Take two pieces of thin card of different colours. Cut them into small rectangles of 5 x 2cm. On the blue (for example) rectangles, write on one side the "beginning of a word", such as CHRONO and on the other its substantive: TIME. On the rectangles of the other colour do the same with an "end of a word". Put the two packets of cards into two boxes.

- First type of game: distribute five word beginnings and five word endings to each player. They must be assembled according to the neologisms for which they form definitions.

Example:

LOGO	TOME
------	------

 → To make chopped phrases



CRYO	TOPE
------	------

 → Refrigerator

PAN	SCAPE
-----	-------

 → Vehicle that goes anywhere

According to their knowledge of etymology, the players can either read or not the other side of the cards.

- Second formula of the game: As in poker, the players can exchange cards. A word that already exists in the dictionary counts double. The same if it is a real object.

Example:

BIBLIO	STAT
--------	------

 → book press

A funny definition gains an extra point

PANMANIA : mania about everything

CHRYSORCHID : property developer

STATODYNAMIC : study of stationary states

PSEUDOGAMIST : someone not really married

PODOCLAST : foot-breaker

PANLOGY : study of everything

COSMOTOPE : place where the Universe is

ELASTOZOAIRE : slug

SCHIZOCRAT : someone who splits everything.

DATABASE

WORD BEGINNINGS :

KLEPTO	STEAL	TOPO	PLACE	GLOSSO	LANGUAGE
CHRONO	TIME	ARCHEO	ANCIENT	HIPPO	HORSE
PISTEMO	SCIENCE	VIDEO	SEE	MELANO	BLACK
LOGO	DISCOURSE	AERO	AIR	NOMO	LAW
PAN	EVERYTHING	HOMO	THE SAME	PETRO	STONE
PATHO	ILLNESS	PRO	FOR	EMBRYO	EMBRYO
HEMI	HALF	ALGO	PAIN	CINEMATO	CINEMA
CRYPTO	HIDDEN	CO	WITH	CRYO	OF COLD
STATO	STEADY STATE	EXTRA	OUTSIDE OF	DERMO	OF THE SKIN
ELASTO	ELASTIC	CEPHALO	HEAD	HELIO	OF THE SUN
ORTHO	STRAIGHT	CRYO	COLD	HEMATO	OF BLOOD
PSEUDO	FALSE	TERATO	MONSTER	HETERO	OTHER
GASTRO	STOMACH	PAPYRO	PAPER	HOMEO	SIMILAR
EROTICO	EROTICISM	PHYTO	VEGETABLE	HYDRO	WATER
ORCHIDO	TESTICLE	PHRENO	BRAIN	METEO	OF THE SKY
PARALLELO	PARALLEL	LATERO	TO THE SIDE	METRO	MEASURE
SEMIO	SENSE	MORPHO	SHAPE	XENO	STRANGER
ERGO	WORK	GNOSEO	KNOWLEDGE	NEO	NEW
GERONTO	OLD	SONO	SOUND	NEURO	OF NERVES
COPRO	EXCREMENT	TELE	DISTANT	PALEO	ANCIENT
MYCO	MUSHROOM	ULTRA	BEYOND	SCHIZO	SPLIT
IDEO	IDEAS	BRADY	SLOW	PHYSIO	OF THE BODY
MAGNETO	MAGNETIC	CHIMIO	OF CHEMISTRY	THERMO	HEAT
PHOTO	LIGHT	GALACIO	MILK	ZOO	ANIMAL
THEO	GOD	GYRO	ROTATION	TACHY	SPEED
NECRO	DEAD	SIDERO	SKY		
MESO	MIDDLE	CHROMO	COLOUR		
PODO	FOOT	ALLO	OTHER		
PORNO	PORNO	ANTHROPO	MAN		
PROTO	FIRST	ADENO	GLAND		
SCATO	EXCREMENT	ANISO	OTHER		
DOXO	OPINION	AGRO	FIELD		
PLUTO	RICHNESS	ARTHRO	CIRCULATION		
PHONO	SOUND	ASTRO	SKY		
INFLATO	SWELLING	ISO	SAME		
PYRO	FIRE	STEREO	SOLID		
GEO	LAND	ENDO	INSIDE OF		
NUCLEO	NUCLEUS	GENO	RACE		
PARA	PARALLEL	LOXO	OBlique		
GRAPHO	OF WRITING	PERI	AROUND		
ODO	PATH	PLURI	NUMEROUS		
PHALLO	PHALLUS	STYLO	STEM		
RADIO	RADIO	XYLO	WOOD		
RETRO	BACKWARDS	AUTO	OF ONESELF		
PSYCHO	SOUL	BACTERIO	BACTERIA		
LITHO	STONE	BIBLIO	BOOK		
MACRO	GREAT	BRONCHO	BRONCHUS		
CHRYSO	GOLD	BUTYRO	BUTTER		
PHILO	LOVE	CACO	BAD		
MICRO	SMALL	CERCO	TAIL		
TECHNO	TECHNICAL	CHROMATO	COLOUR		
BIO	LIFE	APO	ABOVE		
SPELEO	CAVERN	CARDIO	OF THE HEART		
TOMO	CUT	EPI	AROUND		

ENDS OF WORDS :

KLEPTO	STEAL	AERO	AIR
CHRONO	TIME	HOMO	SAME
PISTEMO	SCIENCE	PRO	FOR
LOGO	DISCOURSE	ALGO	PAIN
PAN	EVERYTHING	CO	WITH
PATHO	ILLNESS	EXTRA	OUTSIDE OF
HEMI	HALF	CEPHALO	HEAD
CRYPTO	HIDDEN	CRYO	COLD
STATO	STEADY STATE	TERATO	MONSTER
ELASTO	ELASTIC	PAPYRO	PAPER
ORTHO	STRAIGHT	PHYTO	VEGETABLE
PSEUDO	FALSE	PHRENO	BRAIN
GASTRO	STOMACH	LATERO	BESIDE
EROTICO	EROTICISME	MORPHO	OF THE SHAPE OF
ORCHIDO	TESTICLE	GNOSEO	KNOWLEDGE
PARALLELO	PARALLEL	SONO	SOUND
SEMO	SENSE	TELE	DISTANT
ERGO	WORK	ULTRA	BEYOND
GERONTO	OLD	BRADY	SLOW
COPRO	EXCREMENT	CHIMIO	OF CHEMISTRY
MYCO	MUSHROOM	GALACTO	MILK
IDEO	IDEAS	GYRO	ROTATION
MAGNETO	MAGNETIC	SIDERO	SKY
PHOTO	LIGHT	CHROMO	COLOUR
THEO	GOD	ALLO	OTHER
NECRO	DEAD	ANTHROPO	MAN
MESO	MIDDLE	ADENO	GLAND
PODO	FOOT	ANISO	OTHER
PORNO	PORNO	AGRO	FIELD
PROTO	FIRST		
SCATO	EXCREMENT		
DOXO	OPINION		
PLUTO	RICHNESS		
PHONO	SOUND		
INFLATO	SWELLING		
PYRO	FIRE		
GEO	EARTH		
NUCLEO	NUCLEUS		
PARA	PARALLEL		
GRAPHO	OF WRITING		
ODO	PATH		
PHALLO	PHALLUS		
RADIO	RADIO		
RETRO	BEHIND		
PSYCHO	SOUL		
LITHO	STONE		
MACRO	GREAT		
CHRYSO	GOLD		
PHILO	LOVE		
MICRO	SMALL		
TECHO	TECHNICAL		
BIO	LIFE		
SPELEO	CAVERN		
TOMO	CUT		
TOPO	PLACE		
ARCHEO	ANCIENT		
VIDEO	SEE		

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1 REM LOGOTRON DATA+SENS
10 DIM D$(100),P$(100),F$(100),Q$(100),M$(100),S$(100):I=-1
20 I=I+1
30 READ D$(I),P$(I)
40 IF D$(I)=="*" THEN 60
50 GOTO 20
60 D=I-1
70 J=-1
80 J=J+1
90 READ F$(J),Q$(J)
100 IF F$(J)=="*" THEN 120
110 GOTO 80
120 F=J-1
130 REM RANDOM CREATION OF INDEXES I J
140 I=INT(RND*D)+1: J=INT(RND*F)+1
150 M#=D$(I)+F$(J):REM NEOLOGISM
160 S#=Q$(J)+"-"+P$(I)
170 PRINT M#:PRINT S#:PRINT
180 FOR T=0 TO 1000:NEXT T
190 GOTO 140
200 DATA KLEPTO, STEAL, CHRONO, TIME, EPISTEMO, SCIENCE, LOGO, DISCOURSE, PAN,
EVERYTHING, PATHO, ILLNESS, HEMI, HALF, CRYPTO, HIDDEN
210 DATA EROTICO, EROTICISM, GNOSEO, KNOWLEDGE, ORCHIDO, TESTICLE, PARALLELO,
PARALLEL, SEMIO, SENSE, ERGO, WORK, GERONTO, OLD, COPRO, EXCREMENT, MYCO,
MUSHROOM
220 DATA NECRO, DEAD, MESO, MIDDLE, PODO, FOOT, PORNO, PORNO, PROTO, FIRST,
SCATO, EXCREMENT, DOXO, OPINION, PLUTO, RICHNESS, PHONO, SOUND, INFLATO,
SWELLING, PYRO, FIRE
230 DATA RETRO, BEHIND, PSYCHO, SOUL, LITHO, STONE, MACRO, GREAT, CHRYSO,
GOLD, PHILO, LOVE, MICRO, SMALL, TECNO, TECHNICAL, BIO, LIFE, SPELEO,
CAVERN, TOMO, CUT, TOPO, PLACE, ARCHEO, ANCIENT, VIDEO, SEE
240 DATA CEPHALO, HEAD, CRYO, COLD, TERATO, MONSTER, PAPYRO, PAPER, PHYTO,
VEGETABLE, PHRENO, BRAIN, LATERO, BESIDE, MORPHO, OF THE SHAPE OF
250 DATA SIDERO, SKY, CHROMO, COLOUR, ALLO, OTHER, ANTHROPO, MAN, ADENO,
GLAND, ANISO, OTHER, AGRO, FIELD, ARTHRO, CIRCULATION, ASTRO, SKY
260 DATA AUTO, OF ONESELF, BACTERIO, BACTERIA, BIBLIO, BOOK, BRONCHO,
BRONCHUS, BUTYRO, BUTTER, CACO, BAD, CERCO, TAIL, CHROMATO, COLOUR
270 DATA EMBRYO, EMBRYO, CINEMATO, CINEMA, CRYO, OF COLD, DERMO, OF THE
SKIN, HELIO, OF THE SUN, HEMATO, OF BLOOD, HETERO, OTHER, HOMEO,
SIMILAR, HYDRO, WATER, METEO, OF THE SKY, METRO, MEASURE
280 DATA NEO, NEW, NEURO, OF NERVES, PALEO, ANCIENT, SCHIZO, SPLIT, PHYSIO,
OF THE BODY, THERMO, HEAT, ZOO, ANIMAL, *,*
300 DATA GAME, MARRIAGE, SE, AFFECTION, EDRE, EDIFICE, DYNE, ENERGY, CERCAL, TAIL,
DROME, ROUTE, PHOBIC, WHO DETESTS, PATH, SICK
310 DATA SCAPE, VEHICLE, TOPE, PLACE, TRON, MACHINE, ME, TUMOUR, METER,
MEASURE, NAUT, SAILOR, DRAMA, THEATRE, COSMO, UNIVERSE OF,
SOME, BODY
320 DATA SPHERE, SPHERE, STASIS, STOP, CRAT, POWER, TAPH, TOMB, TROPE,
TENDANCY, MANE, MANIA, GENE, GENERATOR,
ELASTIC, ELASTIC
330 DATA KINE, MOVEMENT, CYTE, CELL, PHRENE, BRAIN, CEPHAL,
HEAD, PITHE, APE,
PTERO, WING
340 DATA MANCIE, PREDICTION, TROPISM, TENDANCY TOWARDS, SAURUS,
ANCESTOR, ZOAIRES, ANIMAL, LITH, STONE, CLAST, BREAKER OF, MACHY,
COMBAT, DYNE, MACHINE
350 DATA DENDRON, TREE, LOGY, DISCOURS ON, ALGIA, LOGIST, SPECIALIST OF
360 DATA ALGIA, PAIN, CHRONO, OF TIME, CHRONIC, REPETITION OF, DACTYL,
FINGER, DOX, OPINION
370 DATA GON, ANGLE, MORPH, THE SHAPE OF, PHAGE, THAT EATS, VORE, THAT
DEVOURS, PHOBIA, FEAR OF
380 DATA PHILE, WHO LOVES, PHONO, SOUND, POLE, TOWN, THERM, HEAT, *,*

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THE LOGOTRON (PROGRAMME)



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